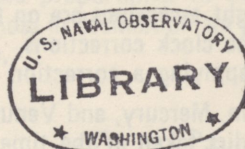


UNITED STATES NAVAL OBSERVATORY

C I R C U L A R N O. 1 4 3

U. S. Naval Observatory, Washington, D. C. 20390

May 31, 1973



OBSERVATIONS OF THE SUN, MOON, AND PLANETS

SIX-INCH TRANSIT CIRCLE RESULTS

by

B. L. Klock and D. K. Scott

OBSERVATIONS OF THE SUN, MOON, AND PLANETS SIX-INCH TRANSIT CIRCLE RESULTS

This *Circular* contains positions of the sun, moon, and planets observed with the Six-Inch Transit Circle during 1971. This concluded the 1963-1971 observing program. These results are provisional. Definitive results will be published later in a volume of *Publications of the U. S. Naval Observatory*.

These results are a continuation of those published in *U. S. Naval Observatory Circular* No. 136.

The observed positions are geocentric and have received the usual corrections for instrumental errors, refraction, diurnal aberration, parallax, and orbital motion. All positions are for the apparent center of the object.

The right ascensions are on the FK4 system through the use of FK4 positions for the stars used to determine the clock corrections. The declinations of the night objects have been reduced to the FK4 system by applying a correction from the same stars used for the clock correction.

The sun, Mercury, and Venus were reduced with the clock correction of the nearest night tour and with the nadirs taken at the time of the observation. Corrections for day minus night differences are not presently available.

Observations of Mercury and Venus were made on the illuminated limb or on the center of light as indicated and reduced with the appropriate corrections to the center of the planet. Observations of the sun, Mars, Jupiter, and Saturn were made on both pairs of limbs; those of Mars and Jupiter were corrected for defective illumination. The tabular semidiameters from the ephemeris were used for the correction from limb to center or to compute the correction for defective illumination. The moon observations were made on the illuminated limbs as indicated and have been reduced with the tabular values of the semidiameter corrected for irradiation and with limb corrections from the charts of C. B. Watts (*Astro. Papers, Vol. XVII*).

The computed positions with which the observed positions are compared were derived from the tabular values of the American Ephemeris for the instant when the *ephemeris* hour angle is zero on the meridian 5h 08m 15^s.849 west longitude. No correction has been made for the difference between Ephemeris and Universal time. The Julian Ephemeris dates refer to the computed times of transit. The distances, in astronomical units, are those interpolated from the ephemeris at the computed time of transit. The ephemerides of the minor planets have been computed from heliocentric rectangular coordinates at the Naval Observatory. For Ceres, Pallas, Juno, and Vesta, these were from R. L. Duncombe (*Astro. Papers, Vol. XX, Part II*); for Flora and Metis, these were computed by P. M. Janiczek. The lunar ephemeris has received differential corrections so that it is on the system $j = 2$ (*Trans. International Astronomical Union, Vol. XIII, 49*). The corrections for parallax in declination for the moon have been made using the IAU dimensions of the earth. Brown's lunation numbers have been indicated.

The observers are identified as follows:

A	J. W. Adair	I	M. R. Kuzio	R	R. W. Rhynsbarger
C	H. E. Crull	J	E. S. Jackson	S	C. A. Smith, Jr.
D	H. E. Durgin	K	B. L. Klock	T	M. D. Robinson
F	R. W. Goebel	L	D. G. Hough	W	P. A. Jones
G	F. S. Gauss	N	B. F. Kerns, Jr.	Y	T. E. Corbin
H	E. R. Holdenried	P	E. J. Coyne		

The values of ΔT from the moon observations (lunation means) are listed in table 1. The mean value of ΔT for 1971 is 40^s44 ($\pm 0^s096$) (P.E.). ΔT is found by dividing (O-C) by 1.002738 times the variation per hour of longitude. The weights in right ascension are proportional to the square of $15 \cos \delta$ times the variation in right ascension per hour of longitude; those in declination are proportional to the square of the variation in declination per hour of longitude.

TABLE 1

Lun.	ΔT	P.E.	Lun.	ΔT	P.E.
594	40 ^s 91	0 ^s 54	601	40 ^s 82	0 ^s 29
596	39.52	0.38	602	40.37	0.22
597	40.31	0.27	603	40.59	0.27
598	39.93	0.36	604	40.99	0.13
599	41.08	0.37	605	39.94	0.18
600	40.79	0.32	606	39.89	0.50

SUN

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L	Obs. Decl.	(O-C)	Distance
244								
			h m s	s		° ' "	"	
71 01 07.71	0959.21840	P	19 12 41.887	+0.156	-22 23	33.97	+1.68	0.983289
71 01 08.71	0960.21869	G	19 17 04.091	+0.069	-22 15	45.66	+1.44	0.983309
71 01 12.71	0964.21982	D	19 34 27.814	+0.119	-21 40	12.52	+1.05	0.983452
71 01 16.72	0968.22083	I	19 51 41.749	+0.120	-20 57	57.45	-0.19	0.983695
71 01 18.72	0970.22129	I	20 00 14.655	+0.042	-20 34	22.15	+1.40	0.983851
71 01 19.72	0971.22151	G	20 04 30.099	+0.044	-20 22	01.69	-0.31	0.983936
71 01 20.72	0972.22172	D	20 08 44.899	+0.119	-20 09			0.984028
71 01 23.72	0975.22230	F	20 21 24.593	+0.056	-19 28	43.77	+0.95	0.984326
71 02 27.72	1010.22300	R	22 40 24.642	+0.075	- 8 23	44.47	+0.75	0.990485
71 02 28.72	1011.22287	F	22 44 10.353	+0.012	- 8 01	06.60	+1.63	0.990720
71 03 01.72	1012.22274	W	22 47 55.656	+0.072	- 7 38	22.97	+1.39	0.990959
71 03 05.72	1016.22216	I	23 02 51.524	+0.074	- 6 06	26.65	+1.63	0.991930
71 03 06.72	1017.22200	R	23 06		- 5 43	14.71	+1.40	0.992179
71 03 07.72	1018.22184	R	23 10 16.682	+0.097	- 5 19	57.43	+1.91	0.992432
71 03 09.72	1020.22149	F	23 17 40.202	+0.127	- 4 33	12.58	+1.21	0.992946
71 03 10.72	1021.22132	W	23 21 21.324	+0.063	- 4 09	46.42	-0.70	0.993208
71 03 12.72	1023.22095	W	23 28 42.633	+0.025	- 3 22	39.93	+0.84	0.993741
71 03 13.72	1024.22076	R	23 32 22.945	+0.111	- 2 59	03.64	+0.86	0.994012
71 03 16.72	1027.22018	P	23 43 22.041	+0.099	- 1 48	05.05	+0.03	0.994841
71 03 17.71	1028.21998	F	23 47 01.240	+0.028	- 1 24	21.78	+0.99	0.995122
71 03 18.71	1029.21978	G	23 50 40.381	+0.077	- 1 00	37.50	+2.35	0.995405
71 03 21.71	1032.21916	R	0 01 36.753	+0.050	+ 0 10	30.32	+1.38	0.996264
71 03 25.71	1036.21833	W	0 16 10.769	+0.177	+ 1 45	09.01	+1.95	0.997415
71 03 27.71	1038.21791	R	0 23 27.351	+0.056	+ 2 32	13.90	+0.57	0.997987
71 03 28.71	1039.21770	R	0 27 05.717	+0.073	+ 2 55	42.41	+0.43	0.998271
71 03 30.71	1041.21728	H	0 34		+ 3 42	28.38	+0.14	0.998836
71 03 31.71	1042.21707	P	0 38 00.999	+0.092	+ 4 05	46.33	+1.20	0.999118
71 04 03.71	1045.21645	R	0 48		+ 5 15	07.56	+0.95	0.999962
71 04 04.71	1046.21625	R	0 52 35.699	+0.048	+ 5 38	03.72	+0.84	1.000244
71 04 05.71	1047.21604	W	0 56 14.748	+0.096	+ 6 00	53.00	-0.10	1.000526
71 04 07.71	1049.21564	D	1 03 33.135	-0.025	+ 6 46	14.30	+0.05	1.001091
71 04 08.71	1050.21545	P	1 07 12.789	+0.069	+ 7 08	45.70	+1.25	1.001375
71 04 09.71	1051.21525	I	1 10 52.538	+0.026	+ 7 31	08.68	+1.29	1.001659
71 04 10.71	1052.21506	R	1 14 32.614	+0.077	+ 7 53	23.10	+0.32	1.001944
71 04 11.71	1053.21488	R	1 18 12.898	+0.057	+ 8 15	30.27	+0.03	1.002229
71 04 12.71	1054.21469	F	1 21 53.452	+0.016	+ 8 37	30.05	+0.63	1.002515
71 04 13.71	1055.21451	I	1 25 34.379	+0.036	+ 8 59	20.58	+0.51	1.002801
71 04 14.71	1056.21433	G	1 29 15.601	+0.022	+ 9 21	02.49	+0.65	1.003088
71 04 15.71	1057.21416	H	1 32 57.217	+0.060	+ 9 42	35.76	+1.27	1.003374
71 04 17.71	1059.21383	R	1 40 21.504	+0.060	+10 25	11.50	+0.67	1.003945
71 04 18.71	1060.21367	R	1 44 04.202	+0.030	+10 46	14.46	+0.54	1.004230
71 04 19.71	1061.21351	F	1 47 47.323	+0.015	+11 07	08.25	+1.83	1.004514
71 04 20.71	1062.21336	P	1 51 30.903	+0.025	+11 27	48.91	+0.81	1.004795
71 04 21.71	1063.21322	F	1 55 14.922	+0.042	+11 48	18.84	+0.31	1.005074
71 04 23.71	1065.21295	W	2 02 44.341	+0.088	+12 28	44.67	+0.41	1.005625
71 04 24.71	1066.21282	R	2 06 29.744	+0.106	+12 48	38.49	-0.34	1.005895
71 04 25.71	1067.21269	R	2 10 15.557	+0.055	+13 08	21.21	+0.45	1.006163
71 04 30.71	1072.21216	P	2 29 12.306	+0.119	+14 43	29.09	+0.13	1.007449
71 05 01.71	1073.21207	R	2 33 01.138	+0.101	+15 01	47.69	-0.14	1.007698
71 05 03.71	1075.21191	H	2 40 40.348	+0.066	+15 37	40.85	+0.44	1.008188
71 05 04.71	1076.21184	I	2 44 30.734	+0.035	+15 55	15.10	+1.64	1.008430
71 05 05.71	1077.21178	H	2 48 21.726	+0.067	+16 12	32.08	+1.44	1.008670
71 05 10.71	1082.21155	D	3 07 44.807	+0.042	+17 34	48.23	+0.18	1.009843
71 05 11.71	1083.21152	P	3 11 39.180	+0.086	+17 50	23.93	+0.08	1.010074
71 05 14.71	1086.21149	W	3 23 25.731	+0.152	+18 35			1.010753

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 5

SUN

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	244		h m s	s		° ' "	"	
71 05 17.71	1089.21151	G	3 35 17.370	+0.039	+19 17 34.65	+0.76	1.011411	
71 05 18.71	1090.21153	F	3 39 15.846	+0.104	+19 30 57.94	-0.86	1.011625	
71 05 19.71	1091.21156	W	3 43 14.820	+0.088	+19 44 03.69	-0.13	1.011834	
71 05 20.71	1092.21159	P	3 47 14.384	+0.086	+19 56 48.52	-0.17	1.012040	
71 05 31.71	1103.21237	R	4 31 43.809	+0.118	+21 53 41.07	-0.64	1.013979	
71 06 01.71	1104.21247	H	4 35 49.079	+0.014	+22 02 04.51	-1.49	1.014127	
71 06 04.71	1107.21280	W	4 48 07.439	+0.018	+22 25 00.07	+0.23	1.014549	
71 06 05.71	1108.21292	R	4 52 14.343	+0.109	+22 31 51.91	+0.95	1.014683	
71 06 07.71	1110.21317	I	5 00 28.819	-0.003	+22 44 22.08	-0.10	1.014941	
71 06 08.71	1111.21330	G	5 04		+22 50 00.75	-1.19	1.015065	
71 06 09.71	1112.21343	P	5 08 44.605	+0.043	+22 55 17.39	-0.35	1.015187	
71 06 10.71	1113.21357	H	5 12 52.837	+0.019	+23 00 08.53	-0.90	1.015305	
71 06 11.71	1114.21370	F	5 17 01.471	+0.156	+23 04 36.78	-0.12	1.015420	
71 06 14.71	1117.21413	D	5 29 27.999	-0.043	+23 15 31.88	-1.04	1.015746	
71 06 17.71	1120.21458	H	5 41 56.188	-0.020	+23 22 46.79	-0.69	1.016034	
71 06 18.71	1121.21473	W	5 46 05.884	+0.065	+23 24 22.94	+0.17	1.016120	
71 06 20.71	1123.21503	R	5 54 25.333	+0.100	+23 26 18.22	-0.64	1.016277	
71 06 22.71	1125.21533	F	6 02		+23 26 33.06	-2.52	1.016409	
71 06 25.71	1128.21579	C	6 15 13.466	-0.017	+23 23 54.10	-0.48	1.016561	
71 06 27.71	1130.21608	R	6 23 32.147	+0.099	+23 20 03.13	-0.44	1.016633	
71 07 03.71	1136.21690	L	6 48 22.715	+0.027	+22 58 42.80	-0.16	1.016728	
71 07 04.71	1137.21703	L	6 52 30.209	+0.048	+22 53 44.44	-0.42	1.016727	
71 07 06.71	1139.21727	C	7 00 44.190	+0.083	+22 42 36.64	-0.58	1.016716	
71 07 07.71	1140.21738	P	7 04 50.539	-0.001	+22 36 26.91	-1.07	1.016705	
71 07 09.71	1142.21760	W	7 13 02.318	+0.044	+22 22		1.016672	
71 07 10.71	1143.21770	L	7 17 07.593	+0.057	+22 15 39.67	-0.55	1.016651	
71 07 12.71	1145.21788	I	7 25		+21 59 52.03	-1.10	1.016598	
71 07 13.71	1146.21797	H	7 29 20.841	+0.089	+21 51 24.96	-0.49	1.016566	
71 07 16.71	1149.21819	L	7 41 29.921	+0.026	+21 23 47.53	-0.57	1.016443	
71 07 18.71	1151.21832	L	7 49 33.572	+0.020	+21 03 32.48	-0.82	1.016335	
71 07 22.71	1155.21849	W	8 05 34.589	+0.089	+20 18 48.23	-0.30	1.016050	
71 07 23.71	1156.21851	D	8 09 33.401	+0.077	+20 06 44.83	-0.87	1.015964	
71 08 02.71	1166.21839	P	8 48 48.246	+0.135	+17 48 33.99	-1.38	1.014816	
71 08 03.71	1167.21834	H	8 52 40.186	+0.003	+17 33 05.78	-0.65	1.014677	
71 08 05.71	1169.21821	W	9 00 22.558	+0.089	+17 01 17.17	-0.69	1.014390	
71 08 06.71	1170.21814	F	9 04 12.721	+0.020	+16 44 58.80	0.00	1.014243	
71 08 09.71	1173.21788	L	9 15 39.853	+0.028	+15 54 24.52	-1.00	1.013786	
71 08 11.71	1175.21767	H	9 23 15.090	+0.049	+15 19 24.32	-1.53	1.013467	
71 08 17.71	1181.21690	C	9 45 47.939	+0.117	+13 28 40.57	-0.90	1.012422	
71 08 19.71	1183.21660	F	9 53 14.708	+0.070	+12 49 59.26	-0.85	1.012038	
71 08 20.71	1184.21644	I	9 56 57.392	+0.084	+12 30 19.55	-1.41	1.011838	
71 08 23.71	1187.21593	I	10 08 02.511	+0.040	+11 30 13.45	-0.20	1.011213	
71 08 24.71	1188.21574	C	10 11 43.322	+0.040	+11 09 48.05	-0.95	1.010996	
71 08 25.71	1189.21556	W	10 15 23.774	+0.120	+10 49 12.94	-1.00	1.010774	
71 08 30.71	1194.21455	I	10 33 39.505	+0.035	+ 9 03 50.76	-1.18	1.009613	
71 08 31.71	1195.21434	C	10 37 17.541	+0.019	+ 8 42 20.60	+0.01	1.009372	
71 09 03.71	1198.21368	W	10 48 09.780	+0.032	+ 7 36 57.28	-1.10	1.008639	
71 09 04.71	1199.21345	L	10 51 46.600	+0.027	+ 7 14		1.008391	

SUN

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244			h m s		s		° ' "		"	
71 09 16.71	1211.21056	D		11 34	55.187	+0.059		+ 2 42	41.31	-0.62	1.005322
71 09 25.70	1220.20836	R		12 07	13.696	+0.133		- 0 47	01.23	-0.62	1.002802
71 09 28.70	1223.20765	D		12 18	01.840	+0.099		- 1 57	08.20	-0.76	1.001929
71 09 29.70	1224.20742	F		12 21	38.265	+0.078		- 2 20	28.32	-0.32	1.001637
71 10 06.70	1231.20589	P		12 47	01.034	+0.103		- 5 02	55.59	-1.33	0.999610
71 10 07.70	1232.20568	W		12 50	39.940	+0.084		- 5 25	55.80	-1.26	0.999325
71 10 08.70	1233.20548	C		12 54	19.295	+0.092		- 5 48	50.39	+0.42	0.999042
71 10 11.70	1236.20492	R		13 05	20.090	+0.111		- 6 57	11.69	+0.27	0.998198
71 10 12.70	1237.20474	R		13 09	01.317	+0.098		- 7 19	49.12	-0.62	0.997918
71 10 13.70	1238.20457	H		13 12	43.073	+0.104		- 7 42	19.82	-0.62	0.997637
71 10 14.70	1239.20441	P		13 16	25.386	+0.135		- 8 04	43.85	-0.32	0.997357
71 10 15.70	1240.20425	D		13 20				- 8 27	02.08	-0.83	0.997076
71 10 19.70	1244.20368	W		13 35	05.379	+0.126		- 9 54	57.42	-0.30	0.995952
71 11 04.70	1260.20267	W		14 36	42.303	+0.114		-15 19			0.991601
71 11 05.70	1261.20268	F		14 40	39.958	+0.193		-15 37	35.04	+1.72	0.991354
71 11 08.70	1264.20277	F		14 52	37.684	+0.117		-16 31	18.15	-0.58	0.990633
71 11 12.70	1268.20304	W		15 08	46.833	+0.128		-17 38	56.83	+0.74	0.989715
71 11 13.70	1269.20313	R		15 12	51.235	+0.076		-17 55			0.989491
71 11 14.70	1270.20323	R		15 16	56.644	+0.165		-18 10	58.85	+0.62	0.989270
71 11 17.70	1273.20359	D		15 29	17.759	+0.158		-18 56	38.89	-0.53	0.988620
71 11 18.70	1274.20373	P		15 33	26.437	+0.091		-19 11	10.11	+1.25	0.988408
71 11 21.70	1277.20421	R		15 45	57.653	+0.133		-19 52	44.20	+0.47	0.987784
71 11 23.70	1279.20458	F		15 54	22.458	+0.156		-20 18	36.95	+1.61	0.987382
71 11 25.70	1281.20498	R		16 02	50.279	+0.135		-20 43	02.19	+0.12	0.986992
71 11 26.70	1282.20519	C		16 07	05.309	+0.135		-20 54			0.986804
71 11 28.70	1284.20564	R		16 15	37.486	+0.110		-21 16	43.04	+0.22	0.986439
71 12 01.70	1287.20638	H		16 28	30.957	+0.082		-21 46	47.48	-0.36	0.985930
71 12 02.70	1288.20664	D		16 32	50.109	+0.083		-21 55	57.53	+1.41	0.985772
71 12 04.70	1290.20718	R		16 41	30.353	+0.134		-22 13	05.33	+1.16	0.985474
71 12 05.70	1291.20747	R		16 45	51.343	+0.136		-22 21	00.74	+1.06	0.985333
71 12 11.70	1297.20929	R		17 12	08.367	+0.091		-22 59	19.66	-0.87	0.984595
71 12 13.70	1299.20993	W		17 20	57.697	+0.143		-23 08	27.46	+0.55	0.984385
71 12 16.71	1302.21094	P		17 34	14.103	+0.133		-23 18	42.95	+1.19	0.984099
71 12 18.71	1304.21162	R		17 43	06.289	+0.120		-23 23	14.58	+0.54	0.983927
71 12 19.71	1305.21196	R		17 47	32.690	+0.166		-23 24	46.09	+2.29	0.983846
71 12 22.71	1308.21300	C		18 00	52.239	+0.079		-23 26	38.52	+0.26	0.983625
71 12 23.71	1309.21335	P		18 05	18.895	+0.134		-23 26	17.37	+1.62	0.983561
71 12 26.71	1312.21438	R		18 18	38.438	+0.181		-23 22	28.41	+1.52	0.983394

MERCURY

71 01 18.64	0970.14948	I	C	18 16	33.357	+0.176	C	-21 56	01.13	-0.24	0.999896
71 01 20.65	0972.15022	D	C	18 25	30.360	+0.096	C	-22 10	49.81	+0.87	1.036108
71 02 28.71	1011.21139	F	C	22 27	35.647	+0.125	C	-11 51	53.40	+1.63	1.381293
71 03 09.73	1020.23001	F	C	23 29	58.205	+0.204	C	- 4 46	15.73	+0.87	1.343413
71 05 18.64	1090.14410	F	C	2 01	54.066	+0.090	C	+ 8 50	56.25	-1.06	0.837603
71 05 31.65	1103.15373	R	C	3 07	03.401	+0.151	C	+15 02	54.40	+0.35	1.066955
71 06 01.65	1104.15536	H		3 13			C	+15 36	53.19	+1.84	1.085009
71 06 10.67	1113.17647	H	C	4 19	18.886	+0.227	C	+20 39	52.38	-1.21	1.235100
71 07 03.75	1136.25942	L	C	7 49	46.120	+0.129	C	+22 58	17.81	-0.60	1.247007
71 07 04.76	1137.26228	L	C	7 57	50.843	+0.041	C	+22 35	49.64	-0.18	1.235044
71 07 10.77	1143.27662	L		8 42			C	+19 51	29.78	-1.39	1.154990
71 07 12.78	1145.28033	I		8 55			C	+18 48	25.04	-0.55	1.126267
71 09 10.66	1205.16565	F	C	10 06	24.405	+0.055	C	+11 38	02.13	+0.60	0.893865
71 09 16.66	1211.16845	D		10 34			C	+10 20	25.20	-0.29	1.061108
71 09 25.68	1220.18359	R	C	11 31	27.698	+0.148	C	+ 5 06	28.20	-2.00	1.267263

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 7

MERCURY

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244			h m s	s			° ' "	"		
71 09 28.68	1223.18929	D	C	11 51	31.104	+0.086	C + 2	53	33.94	-1.40	1.315410
71 10 12.71	1237.21317	R	C	13 21	11.292	+0.133	C - 7	47	41.47	-1.90	1.422355
71 10 15.71	1240.21770	D	C	13 39	33.928	+0.176	C - 9	56	25.78	-1.70	1.425767
71 10 19.72	1244.22358	W	C	14 03	49.105	+0.161	C -12	39	18.79	-0.32	1.421935
71 11 04.74	1260.24665	W	C	15 40	13.110	+0.073	C -21	23	32.82	+1.25	1.321071
71 11 25.76	1281.26953	R	C	17 36	02.922	+0.102	C -25	42	00.06	-1.00	0.973470
71 12 23.65	1309.15681	P	C	16 43	40.336	+0.090	C -19	21	43.23	+1.40	0.822742

VENUS

71 01 06.58	0958.08284	H		15 53			S -16	17	09.35	-0.41	0.564946
71 01 08.58	0960.08247	D	2	16 00	22.538	+0.178	S -16	39	18.27	-1.75	0.580009
71 01 22.58	0974.08333	W	2	16 56	48.176	+0.116	S -19	04	22.36	+0.06	0.686638
71 03 05.60	1016.10598	I	2	20 15	06.473	+0.215	N -18	50	54.81	+0.59	1.000735
71 03 09.60	1020.10850	F	2	20 34	30.763	+0.248	N -18	01	14.67	+1.22	1.029361
71 03 10.60	1021.10912	W	2	20 39	20.752	+0.212	N -17	47	31.17	+2.15	1.036474
71 03 13.61	1024.11093	R	2	20 53	47.848	+0.189	N -17	03	24.22	+0.20	1.057700
71 03 15.61	1026.11211	I	2	21 03	23.169	+0.110	N -16	31	31.90	-0.47	1.071754
71 03 16.61	1027.11270	P	2	21 08	10.084	+0.186	N -16	14	51.21	+0.92	1.078751
71 03 18.61	1029.11383	G	2	21 17	41.887	+0.130	N -15	40	09.68	+0.53	1.092682
71 03 20.61	1031.11495	R	2	21 27	11.248	+0.152	-15 03				1.106526
71 03 21.61	1032.11549	R	2	21 31	55.047	+0.255	N -14	44	45.15	+1.49	1.113413
71 03 27.61	1038.11859	R	2	22 00	02.842	+0.234	N -12	42	50.27	+1.27	1.154237
71 03 28.61	1039.11908	R	2	22 04	41.668	+0.186	N -12	21	11.16	+1.46	1.160955
71 03 30.62	1041.12003	H	2	22 13	57.230	+0.047	N -11	36	51.05	+0.95	1.174319
71 03 31.62	1042.12050	P	2	22 18	34.128	+0.106	N -11	14	10.47	+1.00	1.180965
71 04 01.62	1043.12095	F	2	22 23	10.391	+0.201	N -10	51	09.90	+1.70	1.187586
71 04 03.62	1045.12185	R	2	22 32	20.773	+0.173	N -10	04	14.70	+1.75	1.200755
71 04 04.62	1046.12228	R	2	22 36	55.045	+0.184	N - 9	40	20.72	+1.63	1.207303
71 04 05.62	1047.12271	W	2	22 41	28.701	+0.183	N - 9	16	09.30	+2.14	1.213827
71 04 07.62	1049.12355	D	2	22 50	34.324	+0.217	N - 8	26	57.77	+3.55	1.226799
71 04 08.62	1050.12395	P	2	22 55	06.203	+0.123	N - 8	02	01.05	+2.42	1.233248
71 04 09.62	1051.12436	I	2	22 59	37.715	+0.168	N - 7	36	48.09	+3.14	1.239670
71 04 10.62	1052.12475	R	2	23 04	08.724	+0.209	N - 7	11	22.56	+2.66	1.246067
71 04 11.62	1053.12515	R	2	23 08	39.188	+0.173	N - 6	45	44.50	+1.53	1.252438
71 04 12.62	1054.12553	F	2	23 13	09.262	+0.177	N - 6	19	53.11	+1.13	1.258781
71 04 13.62	1055.12592	I	2	23 17	38.841	+0.103	N - 5	53	49.69	+0.99	1.265098
71 04 15.62	1057.12667	H	2	23 26	36.877	-0.046	N - 5	01	10.12	+0.24	1.277648
71 04 16.62	1058.12704	P	2	23 31	05.617	+0.113	N - 4	34	34.00	+0.99	1.283880
71 04 17.62	1059.12740	R	2	23 35	33.975	+0.188	N - 4	07	47.50	+2.82	1.290083
71 04 18.62	1060.12777	R	2	23 40	01.972	+0.173	N - 3	40	56.23	+0.82	1.296255
71 04 19.62	1061.12813	F	2	23 44	29.703	+0.143	N - 3	13	53.96	+1.89	1.302398
71 04 20.62	1062.12848	P	2	23 48	57.154	+0.046	N - 2	46	46.44	+0.95	1.308509
71 04 22.62	1064.12919	H	2	23 57	51.743	+0.091	N - 1	52	09.48	+2.01	1.320636
71 04 23.62	1065.12954	W	2	0 02	18.894	+0.176	N - 1	24	44.86	+0.52	1.326651
71 04 24.62	1066.12990	R	2	0 06	45.845	+0.165	N - 0	57	13.38	+1.34	1.332633
71 04 25.63	1067.13025	R	2	0 11	12.766	+0.187	N - 0	29	39.01	+1.11	1.338582
71 05 01.63	1073.13235	R	2	0 37	54.508	+0.182	N + 2	16	31.79	+1.12	1.373583
71 05 04.63	1076.13342	I	2	0 51	17.102	+0.167	N + 3	39	35.40	+1.29	1.390634
71 05 05.63	1077.13379	H	2	0 55	45.167	+0.195	N + 4	07	11.31	+0.68	1.396251
71 05 10.63	1082.13567	D	2	1 18	10.731	+0.181	N + 6	24	10.07	+1.23	1.423812
71 05 11.63	1083.13606	P	2	1 22	41.184	+0.174	N + 6	51	16.01	+0.93	1.429218
71 05 14.63	1086.13727	W	2	1 36	15.966	+0.258	N + 8	11	48.27	+1.63	1.445216
71 05 17.63	1089.13855	G	2	1 49	56.318	+0.229	N + 9	30	55.03	+1.72	1.460870
71 05 18.63	1090.13899	F	2	1 54	31.160	+0.200	N + 9	56	55.22	+1.88	1.466009

VENUS

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
244				h	m	s		°	'	"	
71 05 19.63	1091.13944	W	2	1 59	06.785	+.198	N +10	22	41.38	+0.24	1.471107
71 05 20.63	1092.13990	P	2	2 03	43.174	+.178	N +10	48	15.79	-0.12	1.476163
71 05 31.64	1103.14564	R	2	2 55	22.405	+.212		15	11		1.528946
71 06 01.64	1104.14623	H	2	3 00	09.989	+.194	N +15	34	01.89	+1.09	1.533483
71 06 04.64	1107.14807	W	2	3 14	39.165	+.164	N +16	37	54.57	-0.20	1.546823
71 06 07.65	1110.15002	I	2	3 29	18.096	+.046	N +17	38	10.95	+0.60	1.559760
71 06 11.65	1114.15281	F	2	3 49	05.931	+.172	N +18	52	20.37	+0.54	1.576365
71 06 17.65	1120.15738	H	2	4 19	20.649	+.042	N +20	28	50.44	-0.69	1.599832
71 06 18.65	1121.15818	W	2	4 24	27.027	+.184	N +20	43	04.38	-0.63	1.603568
71 06 19.65	1122.15900	R	2	4 29	34.323	+.214	N +20	56	45.80	+0.39	1.607252
71 07 03.67	1136.17146	L	2	5 42	45.565	+.195	N +23	04	51.82	+0.98	1.653256
71 07 04.67	1137.17240	L	2	5 48	04.017	+.160	N +23	09	11.39	+0.24	1.656141
71 07 09.67	1142.17719	W	2	6 14	41.501	+.208	S +23	20			1.669762
71 07 10.67	1143.17815	L	2	6 20	01.542	+.122	S +23	21	01.38	+0.13	1.672324
71 07 12.68	1145.18008	I		6 30			S +23	19	29.27	-0.72	1.677283
71 07 13.68	1146.18105	H		6 36			S +23	17	41.96	-0.41	1.679680
71 07 16.68	1149.18394	L	2	6 52	02.285	+.134	S +23	08	11.69	-0.56	1.686532
71 07 22.68	1155.18963	W	2	7 23	54.619	+.187	S +22	30	47.71	-0.46	1.698682
71 07 24.69	1157.19148	L	2	7 34	28.064	+.096	S +22	12	59.52	+0.45	1.702266
71 08 05.70	1169.20184	W	2	8 36	44.317	+.172	S +19	33	05.84	-2.28	1.718935
71 08 06.70	1170.20263	F	2	8 41	49.667	+.200	S +19	15	56.71	-1.58	1.719956
71 08 09.70	1173.20494	L	2	8 56	59.337	+.126		18	21		1.722689
71 09 06.72	1201.22150	L	1	11 11	17.592	+.139	S + 6	45	39.54	+0.53	1.723951
71 09 07.72	1202.22196	I	1	11 15	53.631	+.152	S + 6	16	28.68	0.00	1.723221
71 09 14.72	1209.22501	P	1	11 47	54.000	+.178	N + 2	47	53.45	-2.08	1.716705
71 09 15.72	1210.22543	I	1	11 52	27.067	+.144	N + 2	17	37.10	-2.40	1.715573
71 09 16.72	1211.22585	D	1	11 56	59.919	+.078	N + 1	47	16.70	-1.83	1.714392
71 09 25.72	1220.22961	R	1	12 37	54.381	+.078	N - 2	47	27.14	-0.13	1.701539
71 09 28.73	1223.23089	D	1	12 51	35.053	+.065	N - 4	18	44.54	-1.44	1.696395
71 10 06.73	1231.23452	P	1	13 28	21.904	+.169	N - 8	17	41.11	-1.53	1.680722
71 10 07.73	1232.23500	W	1	13 33	00.260	+.049	N - 8	46	51.73	-0.72	1.678572
71 10 08.73	1233.23550	C	1	13 37	39.522	+.095	N - 9	15	51.36	-0.35	1.676380
71 10 11.73	1236.23703	R	1	13 51	41.848	+.049	N -10	41	34.51	-0.42	1.669555
71 10 12.73	1237.23756	R	1	13 56	24.384	+.097	N -11	09	40.34	-0.10	1.667197
71 10 13.73	1238.23810	H	1	14 01	07.796	+.119	N -11	37	32.49	-1.54	1.664796
71 10 14.73	1239.23865	P	1	14 05	52.171	+.157	N -12	05	06.58	-1.23	1.662355
71 10 15.73	1240.23921	D	1	14 10	37.375	+.066	N -12	32	21.97	+0.77	1.659872
71 10 19.74	1244.24158	W	1	14 29	48.828	+.024	N -14	18	26.77	-1.14	1.649527
71 11 02.75	1258.25156	C	1	15 39	24.653	+.066	N -19	39	44.34	-1.14	1.608320
71 11 04.75	1260.25321	W	1	15 49	40.719	+.011	N -20	17	51.76	+1.11	1.601844
71 11 05.75	1261.25405	F	1	15 54	50.751	+.140	N -20	36	06.84	+0.92	1.598554
71 11 08.75	1264.25668	F	1	16 10	27.535	+.019		21	27		1.588476
71 11 12.76	1268.26036	W	1	16 31	32.819	+.058	N -22	27	13.98	+0.14	1.574555
71 11 13.76	1269.26131	R	1	16 36	51.831	+.069	N -22	40	35.56	+0.20	1.570988
71 11 14.76	1270.26227	R	1	16 42	11.826	+.057	N -22	53	17.82	-0.03	1.567386
71 11 16.76	1272.26423	H	1	16 52	54.740	+.116	N -23	16	41.80	-0.78	1.560076
71 11 18.76	1274.26623	P	1	17 03	41.198	+.209	N -23	37	19.39	+0.13	1.552627
71 11 25.77	1281.27348	R	1	17 41	44.719	+.137	N -24	27	05.68	-0.58	1.525465
71 12 04.78	1290.28304	R	1	18 31	02.187	+.079	S -24	37	35.07	+0.83	1.488169
71 12 16.79	1302.29533	P	1	19 36	06.135	+.122	S -23	17	27.12	+0.88	1.434527
71 12 21.80	1307.30005	H	1	20 02	37.122	+.183	S -22	13	49.57	+1.51	1.410822
71 12 22.80	1308.30095	C	1	20 07	51.783	+.108	S -21	59	06.23	+1.96	1.405983

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 9

MARS

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	244		h m s	s		° ' "	"	
71 03 08.49	1018.99702	D	17 49 35.613	+0.111	-23 23	52.77	+0.18	1.385234
71 03 09.49	1019.99612	P	17 52 14.725	+0.190	-23 25	32.65	+0.23	1.375841
71 03 10.49	1020.99523	F	17 54 53.524	+0.085	-23 27	03.70	-0.06	1.366457
71 03 16.48	1026.98981	I	18 10 43.769	+0.088	-23 32	57.39	-0.40	1.310361
71 03 18.48	1028.98799	F	18 15 59.022	+0.066	-23 33	42.64	+0.48	1.291748
71 03 21.48	1031.98524	W	18 23 50.220	+0.085	-23 33	46.24	+0.75	1.263920
71 03 30.47	1040.97679	J	18 47 07.254	+0.103	-23 26	28.35	+0.27	1.181241
71 03 31.47	1041.97583	F	18 49 40.709	+0.145	-23 25	00.14	+0.17	1.172147
71 04 01.47	1042.97486	P	18 52 13.700	+0.122	-23 23	24.47	+0.06	1.163075
71 04 03.47	1044.97292	Y	18 57 18.570	+0.199	-23 19	51.00	-0.10	1.144997
71 04 04.47	1045.97194	W	18 59 50.216	+0.086	-23 17	53.70	-0.45	1.135993
71 04 05.47	1046.97096	I	19 02 21.580	+0.130	-23 15	47.52	+0.98	1.127012
71 04 08.46	1049.96798	I	19 09 52.835	+0.149	-23 08	53.35	-0.44	1.100215
71 04 09.46	1050.96697	T	19 12 22.298	+0.136	-23 06	20.63	+0.27	1.091331
71 04 10.46	1051.96596	Y	19 14 51.257	+0.102	-23 03	42.17	+0.23	1.082472
71 04 11.46	1052.96494	S	19 17 19.756	+0.108	-23 00	58.00	-0.40	1.073639
71 04 12.46	1053.96392	H	19 19 47.761	+0.130	-22 58	06.14	+0.31	1.064831
71 04 13.46	1054.96289	P	19 22 15.209	+0.114	-22 55	09.61	-0.33	1.056048
71 04 15.46	1056.96082	W	19 27 08.449	+0.046	-22 48	56.60	+0.67	1.038562
71 04 16.45	1057.95977	T	19 29 34.271	+0.067	-22 45	42.19	+0.63	1.029857
71 04 17.45	1058.95872	P	19 31 59.539	+0.116	-22 42	23.07	-0.13	1.021180
71 04 19.45	1060.95659	D	19 36 48.134	+0.106	-22 35	28.40	-0.79	1.003906
71 04 20.45	1061.95551	I	19 39 11.445	+0.073	-22 31	52.33	+0.20	0.995310
71 04 21.45	1062.95443	J	19 41 34.155	+0.116	-22 28	13.12	-0.37	0.986743
71 04 23.45	1064.95224	H	19 46 17.410	+0.103	-22 20	39.84	+0.06	0.969697
71 04 24.45	1065.95113	W	19 48 37.971	+0.093	-22 16	46.84	+0.37	0.961220
71 04 25.45	1066.95001	S	19 50 57.790	+0.073	-22 12	50.03	+0.67	0.952774
71 04 30.44	1071.94430	J	20 02 25.553	+0.134	-21 52	16.52	-0.01	0.911052
71 05 01.44	1072.94313	P	20 04 40.660	+0.089	-21 48	01.32	-0.47	0.902813
71 05 04.43	1075.93956	G	20 11 21.162	+0.108	-21 34	59.51	-0.15	0.878316
71 05 09.43	1080.93341	S	20 22 11.161	+0.083	-21 12	41.20	-0.09	0.838241
71 05 10.43	1081.93215	H	20 24 18.432	+0.093	-21 08	09.27	+0.75	0.830342
71 05 11.43	1082.93087	W	20 26 24.649	+0.006	-21 03	36.53	+1.78	0.822480
71 05 15.42	1086.92567	P	20 34 39.890	+0.075	-20 45	30.30	+0.86	0.791429
71 05 17.42	1088.92299	H	20 38 41.141	+0.123	-20 36	30.64	+0.55	0.776142
71 05 18.42	1089.92163	I	20 40 39.996	+0.071	-20 32	02.67	+0.48	0.768561
71 05 19.42	1090.92026	F	20 42 37.683	+0.021	-20 27	36.42	+0.41	0.761022
71 05 20.41	1091.91888	W	20 44 34.248	+0.053	-20 23	12.30	+0.22	0.753525
71 05 23.41	1094.91464	I	20 50 16.395	+0.076	-20 10	14.84	-0.17	0.731298
71 05 27.40	1098.90876	F	20 57 34.063	+0.023	-19 53	44.70	-0.43	0.702314
71 06 01.40	1103.90106	I	21 06 09.286	+0.022	-19 34	46.08	+0.82	0.667211
71 06 04.39	1106.89623	P	21 11 00.146	+0.009	-19 24	31.33	+0.23	0.646780
71 06 05.39	1107.89458	W	21 12 33.974	+0.085	-19 21	18.57	+0.76	0.640078
71 06 07.39	1109.89122	T	21 15 36.438	+0.054	-19 15	15.67	+0.32	0.626840
71 06 09.38	1111.88779	T	21 18 31.989	+0.009	-19 09	42.26	+0.91	0.613826
71 06 10.38	1112.88604	F	21 19 57.149	+0.061	-19 07	08.17	+0.77	0.607405
71 06 11.38	1113.88427	P	21 21 20.341	-0.008	-19 04	43.06	+0.24	0.601041
71 06 13.38	1115.88067	W	21 24 01.129	+0.004	-19 00	19.20	+0.32	0.588490
71 06 18.37	1120.87124	H	21 30 07.243	+0.028	-18 52	17.49	-0.40	0.558182
71 06 19.36	1121.86928	W	21 31 13.911	+0.027	-18 51	13.31	+0.39	0.552314
71 06 20.36	1122.86729	Y	21 32 18.335	+0.071	-18 50	21.60	+0.49	0.546513
71 06 21.36	1123.86528	T	21 33 20.313	+0.011	-18 49	42.49	+0.05	0.540782
71 06 22.36	1124.86323	J	21 34 19.975	+0.021	-18 49	15.41	-0.05	0.535122
71 06 25.35	1127.85694	T	21 37 04.135	-0.016	-18 49	09.89	+0.19	0.518580
71 06 26.35	1128.85478	D	21 37 53.822	-0.008	-18 49	33.92	+0.42	0.513218

MARS

Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244			h	m	s		°	'	"	
71 06 28.35	1130.85038	I		21	39	25.456		-18	51	02.28	+0.53 0.502731
71 07 03.33	1135.83882	W		21	42	27.097		-18	58	40.77	+0.45 0.477949
71 07 04.33	1136.83642	S		21	42	55.141		-19	00	53.70	+0.43 0.473250
71 07 06.33	1138.83150	Y		21	43	42.545		-19	06	00.25	+1.02 0.464119
71 07 07.32	1139.82899	S		21	44	01.771		-19	08	54.85	+0.63 0.459689
71 07 08.32	1140.82645	P		21	44	18.100		-19	12	03.07	+0.36 0.455353
71 07 12.31	1144.81593	W		21	44	53.163		-19	26	51.14	-0.19 0.438963
71 07 13.31	1145.81322	F		21	44	54.132		-19	31	05.27	+0.64 0.435113
71 07 15.30	1147.80767	L		21	44	46.842		-19	40	13.34	+0.97 0.427724
71 07 18.29	1150.79908	I		21	44	12.131		-19	55	25.84	+0.36 0.417450
71 07 21.29	1153.79016	L		21	43	09.496		-20	12	12.94	-0.30 0.408199
71 07 22.28	1154.78712	H		21	42	42.510		-20	18	05.96	-0.26 0.405353
71 07 23.28	1155.78405	W		21	42	12.589		-20	24	06.17	+0.23 0.402629
71 07 24.28	1156.78094	S		21	41	39.867		-20	30	13.52	+0.18 0.400029
71 07 28.26	1160.76819	G		21	39	01.858		-20	55		0.390898
71 07 29.26	1161.76493	F		21	38	16.064		-21	01	54.42	-0.32 0.388939
71 08 06.23	1169.73805	L		21	30	59.179		-21	52	03.45	+0.20 0.378088
71 08 07.23	1170.73461	Y		21	29	57.846		-21	57	54.58	+0.49 0.377343
71 08 08.23	1171.73116	S		21	28	55.510		-22	03	38.43	-0.63 0.376735
71 08 09.22	1172.72770	T		21	27	52.325		-22	09	10.76	+0.09 0.376266
71 08 10.22	1173.72423	J		21	26	48.593		-22	14	33.05	+0.01 0.375935
71 08 11.22	1174.72076	C		21	25	44.295		-22	19	43.86	+0.04 0.375742
71 08 15.20	1178.70686	Y		21	21	26.028		-22	38	13.72	+0.22 0.376362
71 08 16.20	1179.70339	T		21	20	22.142		-22	42	13.80	+0.18 0.376865
71 08 17.19	1180.69993	J		21	19	18.890		-22	45	57.52	+0.09 0.377507
71 08 18.19	1181.69648	C		21	18	16.529		-22	49	23.84	+0.29 0.378287
71 08 20.18	1183.68962	F		21	16	15.216		-22	55	22.84	+0.65 0.380259
71 08 21.18	1184.68621	S		21	15	16.567		-22	57	54.98	+0.14 0.381449
71 08 24.17	1187.67611	L		21	12	31.069		-23	03	33.33	+0.60 0.385817
71 08 25.17	1188.67279	J		21	11	39.961		-23	04	46.84	+0.30 0.387535
71 08 26.16	1189.66949	Y		21	10	51.119		-23	05	39.68	+0.53 0.389380
71 08 29.15	1192.65978	W		21	08	39.257		-23	06	17.83	+0.86 0.395661
71 08 30.15	1193.65660	T		21	08	00.641		-23	05		0.397997
71 08 31.15	1194.65346	I		21	07	24.883		-23	05	03.59	+0.89 0.400451
71 09 03.14	1197.64424	L		21	05	55.304		-23	00	46.91	+0.37 0.408497
71 09 04.14	1198.64123	W		21	05	31.517		-22	58	43.85	+0.04 0.411401
71 09 05.13	1199.63826	Y		21	05	10.790		-22	56	21.22	+0.84 0.414411
71 09 06.13	1200.63533	S		21	04	53.231		-22	53	41.61	+0.66 0.417528
71 09 07.13	1201.63243	T		21	04	38.767		-22	50	44.37	+0.34 0.420749
71 09 08.12	1202.62957	J		21	04	27.600		-22	47	29.76	+0.06 0.424072
71 09 09.12	1203.62675	D		21	04	19.600		-22	43	57.01	+1.02 0.427496
71 09 10.12	1204.62396	H		21	04	14.791		-22	40	09.11	+0.26 0.431019
71 09 15.11	1209.61059	F		21	04	39.316		-22	17	04.90	+1.02 0.450080
71 09 16.10	1210.60803	J		21	04	53.863		-22	11	43.18	-0.18 0.454169
71 09 25.08	1219.58659	R		21	09	25.538		-21	12	42.46	-0.13 0.494739
71 09 26.08	1220.58438	J		21	10	10.594		-21	05	03.49	-0.28 0.499634
71 09 29.07	1223.57794	I		21	12	42.484		-20	40		0.514733
71 09 30.07	1224.57586	R		21	13	38.373		-20	32	27.68	+0.66 0.519901
71 10 06.06	1230.56394	I		21	20	05.117		-19	38	06.93	+0.62 0.552232
71 10 07.06	1231.56205	F		21	21	17.503		-19	28		0.557832
71 10 08.06	1232.56018	H		21	22	31.993		-19	18	39.20	+0.73 0.563492
71 10 09.05	1233.55833	D		21	23	48.552		-19	08	41.24	+0.44 0.569211
71 10 12.05	1236.55292	R		21	27	50.111		-18	37	50.47	+0.30 0.586711
71 10 13.05	1237.55117	I		21	29	14.336		-18	27	14.55	+0.85 0.592657
71 10 15.04	1239.54771	W		21	32	08.371		-18	05	36.60	+0.66 0.604714

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 11

MARS

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244		h m s		s		° ' "	"		
71 10 16.04	1240.54602	P	21 33	37.922	+0.23	-17 54	34.84	+0.02		0.610823
71 10 22.03	1246.53623	D	21 43	09.455	+0.014	-16 45	16.10	+1.44		0.648548
71 11 04.01	1259.51691	F	22 06	30.791	+0.029	-13 58	55.26	+0.86		0.735892
71 11 06.01	1261.51412	D	22 10	21.790	+0.045	-13 31	35.63	+0.78		0.749949
71 11 08.01	1263.51136	I	22 14	16.060	-0.003	-13 03	49.34	+2.32		0.764165
71 11 09.01	1264.51000	H	22 16	14.442	+0.033	-12 49	50.01	+0.03		0.771333
71 11 11.00	1266.50729	C	22 20	13.369	-0.010	-12 21				0.785787
71 11 12.00	1267.50596	W	22 22	13.972	.000	-12 07	08.71	+0.55		0.793073
71 11 13.00	1268.50462	D	22 24	15.314	+0.050	-11 52	43.25	+0.73		0.800396
71 11 14.00	1269.50330	R	22 26	17.274	+0.029	-11 38	12.02	+0.78		0.807757
71 11 15.00	1270.50199	T	22 28	19.901	-0.004	-11 23	35.37	+0.67		0.815156
71 11 16.00	1271.50068	S	22 30			-11 08	52.80	+0.89		0.822590
71 11 16.99	1272.49938	R	22 32	27.200	+0.036	-10 54				0.830060
71 11 17.99	1273.49665	R	22 34			-10 39	11.71	+2.39		0.837556
71 11 18.99	1274.49680	D	22 36	36.908	+0.009	-10 24	13.41	+0.97		0.845108
71 11 21.99	1277.49299	R	22 42	55.827	-0.001	- 9 38	48.80	+0.22		0.867931
71 11 23.99	1279.49047	F	22 47	11.139	+0.051	- 9 08	07.33	+0.99		0.883307
71 11 25.98	1281.48798	R	22 51	28.330	+0.023	- 8 37	09.57	+0.37		0.898806
71 11 28.98	1284.48428	T	22 57	57.430	-0.009	- 7 50	11.69	+0.48		0.922277
71 11 30.98	1286.48184	R	23 02	18.946	+0.050	- 7 18	34.40	+0.61		0.938069
71 12 01.98	1287.48062	F	23 04	30.239	+0.049	- 7 02	40.04	+1.29		0.946007
71 12 02.97	1288.47941	H	23 06	41.878	+0.035	- 6 46	43.19	+1.17		0.953973
71 12 03.97	1289.47820	J	23 08	53.863	+0.017	- 6 30	43.85	+0.53		0.961969
71 12 04.97	1290.47700	S	23 11	06.216	+0.017	- 6 14				0.969994
71 12 11.96	1297.46868	R	23 26	41.644	+0.028	- 4 21	03.90	+0.50		1.026946
71 12 13.96	1299.46634	C	23 31	11.701	+0.011	- 3 48				1.043459
71 12 17.96	1303.46169	P	23 40	15.418	+0.003	- 2 42	13.59	+0.41		1.076779
71 12 18.96	1304.46054	J	23 42	32.079	+0.012	- 2 25	40.31	-0.70		1.085166
71 12 20.95	1306.45824	F	23 47	06.192	-0.017	- 1 52	26.37	+0.53		1.102005
71 12 22.95	1308.45596	I	23 51	41.417	+0.005	- 1 19	09.74	+0.21		1.118923
71 12 23.95	1309.45482	K	23 53	59.414	+0.001	- 1 02	29.75	+0.57		1.127412
71 12 27.95	1313.45030	F	0 03	13.854	+0.014	+ 0 04	12.67	-0.02		1.161539
71 12 28.94	1314.44918	H	0 05	33.047	+0.005	+ 0 20	54.39	+0.53		1.170113
71 12 30.94	1316.44694	K	0 10	12.114	-0.021	+ 0 54	15.90	+0.35		1.187312

JUPITER

71 03 01.45	1011.95127	H	16 15			-20 19	26.86	-1.38	5.216575
71 03 05.44	1015.94106	T	16 16	57.792	+0.037	-20 21	34.49	+0.11	5.152059
71 03 06.43	1016.93848	S	16 17	11.378	+0.019	-20 22	02.06	+0.12	5.136018
71 03 08.43	1018.93331	D	16 17	36.309	-0.030	-20 22	51.14	+0.58	5.104071
71 03 09.43	1019.93071	P	16 17	47.706	+0.001	-20 23	14.08	-0.43	5.088172
71 03 10.42	1020.92810	F	16 17	58.331	+0.015	-20 23	31.75	+1.94	5.072329
71 03 18.40	1028.90692	F	16 18	55.692	-0.012	-20 25	05.98	+0.15	4.948098
71 03 21.39	1031.89883	W	16 19	04.480	+0.051	-20 25	10.40	-0.37	4.902944
71 03 22.39	1032.89612	Y	16 19	05.773	+0.015	-20 25	08.35	-0.73	4.888102
71 03 27.38	1037.88241	P	16 19	00.520	+0.050	-20 24	27.31	+0.29	4.815685
71 03 30.37	1040.87407	F	16 18	47.772	-0.051	-20 23	40.05	+1.30	4.773845
71 03 31.37	1041.87127	J	16 18	42.108	+0.060	-20 23	22.85	-0.51	4.760195
71 04 03.36	1044.86283	Y	16 18	20.122	+0.041	-20 22	14.85	-0.18	4.720198
71 04 04.35	1045.85999	W	16 18	11.251	+0.029	-20 21	48.92	-0.34	4.707197
71 04 05.35	1046.85715	I	16 18	01.661	+0.059	-20 21	20.13	+0.60	4.694369
71 04 08.34	1049.84858	I	16 17	28.313	+0.074	-20 19	46.54	+0.03	4.656962
71 04 09.34	1050.84570	T	16 17	15.612	-0.026	-20 19	12.01	-0.32	4.644866
71 04 10.34	1051.84282	Y	16 17	02.350	+0.040	-20 18	35.15	-0.08	4.632961
71 04 11.33	1052.83992	S	16 16	48.252	-0.012	-20 17	56.88	-0.17	4.621253
71 04 12.33	1053.83702	H	16 16	33.488	-0.018	-20 17	17.29	-0.64	4.609745

JUPITER

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
244			h m s		s		° ' "		"	
71 04 13.33	1054.83411	P	16 16	18.039	-0.005	-20 16	34.98	-0.08		4.598441
71 04 15.32	1056.82827	W	16 15	45.106	+0.063	-20 15	05.44	+0.98		4.576461
71 04 16.32	1057.82534	T	16 15	27.515	-0.003	-20 14	19.85	-0.14		4.565793
71 04 17.32	1058.82240	P	16 15	09.327	+0.005	-20 13	31.11	+0.27		4.555344
71 04 20.31	1061.81353	I	16 14	10.797	+0.009	-20 10	56.36	+0.37		4.525354
71 04 21.31	1062.81056	J	16 13	50.000	+0.005	-20 10	01.52	+0.48		4.515822
71 04 23.30	1064.80460	H	16 13			-20 08	07.28	+0.57		4.497481
71 04 24.30	1065.80161	W	16 12	43.926	-0.034	-20 07	08.47	0.00		4.488680
71 04 25.29	1066.79861	S	16 12	20.810	+0.027	-20 06	07.68	-0.05		4.480128
71 04 30.28	1071.78353	J	16 10	16.885	-0.020	-20 00	42.83	-0.06		4.441245
71 05 01.28	1072.78049	P	16 09	50.632	-0.009	-19 59	33.92	-0.01		4.434263
71 05 04.27	1075.77136	G	16 08	29.182	-0.001	-19 56	00.36	-0.33		4.414946
71 05 09.25	1080.75605	S	16 06			-19 49	41.67	-0.32		4.388311
71 05 10.25	1081.75298	H	16 05	35.969	-0.030	-19 48	22.26	+0.41		4.383833
71 05 11.24	1082.74990	W	16 05	06.006	-0.031	-19 47	02.91	+0.21		4.379642
71 05 15.23	1086.73757	P	16 03	03.750	-0.008	-19 41	37.50	-0.17		4.365773
71 05 19.22	1090.72520	F	16 00	58.533	+0.021	-19 36	01.69	-0.14		4.356598
71 05 27.20	1098.70043	F	15 56	44.805	+0.003	-19 24	34.42	+0.20		4.352558
71 06 02.18	1104.68189	H	15 53	37.454	+0.001	-19 16	02.63	+0.56		4.362030
71 06 09.16	1111.66037	T	15 50	08.918	-0.013	-19 06	30.37	+0.46		4.386246
71 06 10.15	1112.65731	F	15 49	40.395	+0.001	-19 05	12.60	-0.13		4.390830
71 06 11.15	1113.65425	P	15 49	12.186	-0.035	-19 03	55.48	-0.32		4.395689
71 06 18.13	1120.63299	H	15 46	06.494	-0.049	-18 55	27.25	+0.50		4.437225
71 06 19.12	1121.62998	W	15 45	41.836	-0.038	-18 54	20.82	-0.02		4.444207
71 06 20.12	1122.62697	Y	15 45	17.697	-0.023	-18 53	15.16	+0.30		4.451442
71 06 21.12	1123.62397	T	15 44	54.036	-0.062	-18 52	11.30	+0.48		4.458928
71 06 22.12	1124.62097	J	15 44	31.000	-0.021	-18 51	09.86	-0.02		4.466664
71 06 25.11	1127.61202	T	15 43			-18 48	14.40	+0.44		4.491320
71 06 26.10	1128.60905	D	15 43	04.395	-0.015	-18 47	19.98	+0.30		4.500011
71 06 28.10	1130.60313	I	15 42	24.689	-0.003	-18 45	36.80	+0.21		4.518076
71 06 29.10	1131.60018	P	15 42	05.739	-0.030	-18 44	48.58	-0.19		4.527444
71 07 03.08	1135.58846	A	15 40	56.601	+0.032	-18 41				4.567051
71 07 04.08	1136.58555	S	15 40	40.885	-0.051	-18 41	16.40	+0.59		4.577467
71 07 05.08	1137.58265	T	15 40	25.935	-0.052	-18 40	41.10	+0.24		4.588080
71 07 06.07	1138.57975	Y	15 40	11.664	-0.061	-18 40	07.38	+0.58		4.598886
71 07 08.07	1140.57398	A	15 39	45.367	+0.085	-18 39				4.621064
71 07 11.06	1143.56540	C	15 39	10.871	-0.004	-18 37	55.42	+0.78		4.655684
71 07 13.05	1145.55971	A	15 38	51.475	-0.012	-18 37				4.679621
71 07 14.05	1146.55688	H	15 38	42.872	-0.002	-18 37	04.53	+1.15		4.691837
71 07 16.05	1148.55125	D	15 38	27.777	-0.064	-18 36				4.716741
71 07 17.04	1149.54844	P	15 38	21.406	-0.025	-18 36	36.57	+0.64		4.729420
71 07 18.04	1150.54565	I	15 38	15.764	+0.001	-18 36	31.44	+1.29		4.742248
71 07 21.03	1153.53731	L	15 38	03.205	-0.029	-18 36	34.36	+0.21		4.781569
71 07 22.03	1154.53455	H	15 38	00.510	-0.042	-18 36	39.68	+0.60		4.794941
71 07 24.02	1156.52905	S	15 37	57.420	-0.012	-18 36	58.82	+0.47		4.822054

SATURN

71 01 08.03	0959.53929	G	2 56 02.745	-0.018	+14 19 57.45	-0.49	8.618123
71 01 10.03	0961.53373	W	2 55 54.574	-0.028	+14 19 58.34	-0.08	8.647461
71 01 12.02	0963.52820	G	2 55 48.182	+0.003	+14 20 06.86	+0.06	8.677327
71 01 15.01	0966.51993	I	2 55 41.767	-0.046	+14 20 33.83	-0.21	8.723035
71 01 17.01	0968.51445	R	2 55 39.749	-0.014	+14 21 02.82	+0.85	8.754058

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 13

SATURN

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
244			h m s	s	° ' "	"	"	
71 01 19.00	0970.50899	P	2 55 39.502	+0.017	+14 21			8.785476
71 01 20.00	0971.50626	S	2 55 39.991	-.023	+14 21 59.18	+0.68		8.801322
71 01 21.00	0972.50354	D	2 55 41.000	+0.010	+14 22 22.17	+0.91		8.817251
71 01 23.99	0975.49542	P	2 55 46.599	-.012	+14 23 41.96	+0.62		8.865492
71 09 04.44	1198.94167	W	4 19 20.137	-.087	+19 22 07.70	+0.07		8.944976
71 09 05.43	1199.93901	Y	4 19 26.693	-.029	+19 22 14.09	+0.61		8.928562
71 09 06.43	1200.93635	S	4 19 32.829	+0.047	+19 22 18.51	+0.29		8.912176
71 09 07.43	1201.93368	T	4 19		+19 22 21.49	-0.34		8.895821
71 09 09.42	1203.92834	D	4 19 48.316	-.011	+19 22 26.58	+0.82		8.863223
71 09 10.42	1204.92566	H	4 19 52.620	-.008	+19 22 26.46	+0.36		8.846989
71 09 15.41	1209.91218	F	4 20 07.372	-.007	+19 22 12.30	+0.43		8.766642
71 09 16.40	1210.90946	J	4 20 08.955	-.006	+19 22			8.750772
71 09 25.38	1219.88482	W	4 20 02.591	-.019	+19 20 23.84	+0.48		8.612060
71 09 29.37	1223.87373	D	4 19 48.015	-.017	+19 19 10.18	-1.15		8.553388
71 09 30.37	1224.87094	I	4 19 43.267	-.002	+19 18 51.78	+0.90		8.539062
71 10 07.35	1231.85130	F	4 18 57.666	+0.008	+19 16 00.78	+0.49		8.443093
71 10 08.34	1232.84848	H	4 18 49.403	-.033	+19 15 31.80	-0.36		8.430050
71 10 12.33	1236.83713	D	4 18 12.352	-.016	+19 13 29.69	-0.99		8.379725
71 10 15.32	1239.82857	J	4 17 40.270	+0.010	+19 11 50.43	+0.08		8.344050
71 10 18.31	1242.81996	W	4 17 04.608	-.006	+19 10 02.90	+0.54		8.310285
71 10 19.31	1243.81709	H	4 16 51.970	-.007	+19 09 25.29	+0.55		8.299475
71 10 22.30	1246.80843	D	4 16 11.863	-.038	+19 07 27.64	+0.36		8.268443
71 10 29.28	1253.78810	F	4 14 26.693	+0.035	+19 02 29.95	+0.76		8.204664
71 11 04.27	1259.77055	F	4 12 44.993	-.029	+18 57 50.64	+0.65		8.160288
71 11 05.26	1260.76761	W	4 12 27.171	-.039	+18 57 01.65	-0.05		8.153862
71 11 06.26	1261.76467	D	4 12 09.186	+0.015	+18 56			8.147719
71 11 08.25	1263.75879	T	4 11 32.486	+0.051	+18 54 34.98	+0.62		8.136296
71 11 09.25	1264.75584	H	4 11 13.798	+0.042	+18 53 44.56	+0.10		8.131020
71 11 11.24	1266.74994	J	4 10 35.847	+0.021	+18 52 03.82	+0.21		8.121356
71 11 12.24	1267.74699	I	4 10 16.567	-.029	+18 51 13.24	+0.54		8.116972
71 11 14.24	1269.74108	W	4 09 37.696	+0.026	+18 49 31.00	+0.95		8.109110
71 11 17.23	1272.73221	H	4 08 38.287	-.002	+18 46 54.96	+0.46		8.099612
71 11 18.22	1273.72924	S	4 08 18.273	-.007	+18 46 02.81	+0.45		8.097064
71 11 19.22	1274.72628	D	4 07 58.171	-.012	+18 45 11.01	+0.85		8.094828
71 11 21.22	1276.72035	I	4 07 17.711	-.057	+18 43 26.05	+0.39		8.091294
71 11 22.21	1277.71739	H	4 06 57.443	-.030	+18 42 34.46	+1.05		8.085998
71 12 02.18	1287.68774	F	4 03 34.085	+0.011	+18 33 57.93	+0.21		8.094325
71 12 03.18	1288.68477	H	4 03 13.983	+0.025	+18 33 07.27	-0.27		8.096478
71 12 05.17	1290.67885	S	4 02 33.944	-.039	+18 31 28.53	+0.14		8.101714
71 12 12.15	1297.65817	R	4 00 17.870	+0.020	+18 25 56.88	+0.16		8.129728
71 12 14.15	1299.65227	C	3 59 40.466	+0.043	+18 24			8.140458
71 12 19.13	1304.63759	J	3 58 10.645	+0.009	+18 20 57.63	+0.02		8.172437
71 12 22.12	1307.62881	H	3 57 19.723	-.019	+18 19 02.61	+0.32		8.195054
71 12 23.12	1308.62589	I	3 57 03.314	-.013	+18 18 25.12	-0.62		8.203146
71 12 28.11	1313.61134	F	3 55 45.783	-.039	+18 15 38.27	+0.07		8.247598
71 12 31.10	1316.60266	K	3 55 03.213	-.069	+18 14 11.46	+0.51		8.277328

URANUS

71 01 08.45	0959.95121	I	12 50 50.378	-.057	- 4 41 46.77	+0.64		18.242045
71 01 16.42	0967.92949	S	12 51 00.635	-.034	- 4 42 34.12	-0.15		18.106224
71 01 19.42	0970.92130	F	12 51 00.980	-.077	- 4 42 29.32	+0.42		18.056162
71 01 20.41	0971.91857	G	12 51 00.730	-.044	- 4 42 26.10	-0.35		18.039627
71 01 21.41	0972.91583	J	12 51 00.249	-.037	- 4 42 20.62	-0.17		18.023168

URANUS

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244		h m s	s			° ' "	"		
71 02 28.31	1010.81023	T	12 48	20.482	-.049	- 4	24 24.86	-0.72	17.508121	
71 03 01.30	1011.80741	H	12 48	13.070	-.062	- 4	23 36.72	-0.55	17.498615	
71 03 05.29	1015.79614	T	12 47	42.299	-.037	- 4	20 17.32	-0.26	17.463196	
71 03 06.29	1016.79331	S	12 47	34.305	-.046	- 4	19 26.01	-0.44	17.455012	
71 03 10.28	1020.78201	F	12 47	01.288	-.056	- 4	15 53.39	-0.12	17.425003	
71 03 16.26	1026.76503	I	12 46	09.016	-.052	- 4	10 18.18	+0.12	17.388407	
71 03 17.26	1027.76219	S	12 46	00.029	-.060	- 4	09 21.19	-0.28	17.383309	
71 03 18.25	1028.75936	F	12 45	50.999	-.046	- 4	08 23.47	-0.33	17.378509	
71 03 21.25	1031.75085	W	12 45	23.478	-.080	- 4	05 28.01	-0.20	17.365874	
71 03 28.23	1038.73098	G	12 44	17.721	-.042	- 3	58 29.49	+0.04	17.346901	
71 03 30.22	1040.72530	F	12 43	58.644	-.069	- 3	56 28.42	+0.34	17.344207	
71 03 31.22	1041.72246	J	12 43	49.128	-.045	- 3	55 27.94	+0.40	17.343319	
71 04 01.21	1042.71961	P	12 43	39.587	-.039	- 3	54 27.77	+0.15	17.342739	
71 04 04.21	1045.71109	G	12 43	10.924	-.055	- 3	51 26.69	+0.21	17.342815	
71 04 08.19	1049.69973	D	12 42	32.848	-.053	- 3	47 26.59	+0.26	17.347150	
71 04 09.19	1050.69689	F	12 42	23.402	-.029	- 3	46 27.43	-0.20	17.348975	
71 04 10.19	1051.69405	I	12 42	13.960	-.030	- 3	45 27.35	+0.50	17.351109	
71 04 11.19	1052.69121	W	12 42	04.529	-.055	- 3	44 28.53	+0.19	17.353538	
71 04 12.18	1053.68838	G	12 41	55.198	-.019	- 3	43 29.89	-0.03	17.356259	
71 04 13.18	1054.68554	F	12 41	45.825	-.067	- 3	42 31.19	+0.13	17.359283	
71 04 14.18	1055.68270	S	12 41	36.593	-.022	- 3	41 32.77	+0.34	17.362590	
71 04 15.17	1056.67986	G	12 41	27.350	-.039	- 3	40 35.01	+0.26	17.366201	
71 04 16.17	1057.67703	H	12 41	18.183	-.033	- 3	39 37.77	+0.03	17.370093	
71 04 17.17	1058.67419	W	12 41	09.051	-.049	- 3	38 40.96	-0.23	17.374283	
71 04 19.16	1060.66852	Y	12 40	51.016	-.030	- 3	36 48.08	-0.22	17.383526	
71 04 20.16	1061.66569	F	12 40	42.072	-.043	- 3	35 52.08	0.00	17.388579	
71 04 23.15	1064.65719	Y	12 40	15.673	-.074	- 3	33 07.99	-0.29	17.405428	
71 04 25.15	1066.65153	D	12 39	58.536	-.043	- 3	31 21.24	-0.35	17.418070	
71 04 30.13	1071.63741	W	12 39	17.322	-.040	- 3	27 05.72	-0.33	17.454420	
71 05 01.13	1072.63458	G	12 39	09.389	-.041	- 3	26 16.79	-0.40	17.462473	
71 05 02.13	1073.63176	Y	12 39	01.562	-.046	- 3	25 29.09	-0.96	17.470795	
71 05 05.12	1076.62331	I	12 38	38.755	-.073	- 3	23 08.67	-0.74	17.497265	
71 05 09.11	1080.61206	S	12 38	10.120	-.071	- 3	20 12.56	-0.08	17.535958	
71 05 10.10	1081.60925	Y	12 38	03.343	-.022	- 3	19 30.76	+0.05	17.546215	
71 05 11.10	1082.60644	D	12 37	56.611	-.068	- 3	18 50.05	+0.02	17.556700	
71 05 12.10	1083.60363	Y	12 37	50.089	-.046	- 3	18 10.45	-0.19	17.567414	
71 05 15.09	1086.59523	W	12 37	31.365	-.005	- 3	16 16.27	+0.29	17.600865	
71 05 18.08	1089.58683	T	12 37	13.895	-.038	- 3	14 32.17	-0.57	17.636213	
71 05 19.08	1090.58404	S	12 37	08.363	-.062	- 3	13 59.09	-0.48	17.648405	
71 05 20.08	1091.58125	T	12 37	02.998	-.075	- 3	13 26.86	-0.23	17.660786	
71 05 23.07	1094.57288	J	12 36	47.936	-.064	- 3	11 57.78	-0.64	17.699103	
71 05 24.07	1095.57010	Y	12 36	43.240	-.074	- 3	11 29.81	-0.29	17.712239	
71 05 27.06	1098.56175	H	12 36	30.249	-.049	- 3	10 13.25	+0.23	17.752701	
71 05 28.05	1099.55898	G	12 36	26.244	-.062	- 3	09 50.10	+0.32	17.766521	
71 06 02.04	1104.54513	T	12 36	08.937	-.052	- 3	08 11.66	+0.58	17.837902	
71 12 22.50	1308.00938	S	13 06	51.164	-.047	- 6	24 12.03	-0.13	18.637453	
71 12 23.50	1309.00672	C	13 06	57.556	-.067	- 6	24 49.17	+0.22	18.621064	
71 12 25.50	1311.00140	R	13 07	09.856	-.017	- 6	26 01.26	-0.49	18.588051	
71 12 29.49	1314.99074	H	13 07	32.073	-.017	- 6	28 09.20	+0.04	18.521173	
71 12 31.48	1316.98539	I	13 07	42.033	-.010	- 6	29 06.68	-0.36	18.487393	

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 15

NEPTUNE

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	244		h m s	s		° ' "	"		
71 03 05.43	1015.93312	T	16 05	29.444	-.283	-19 07	44.93	+0.84	30.113811
71 03 06.43	1016.93039	S	16 05	29.392	-.352	-19 07	41.03	+1.57	30.096929
71 03 08.42	1018.92492	D	16 05	29.014	-.343	-19 07	33.54	+1.64	30.063360
71 03 09.42	1019.92219	P	16 05	28.637	-.316	-19 07	29.84	+1.07	30.046678
71 03 10.41	1020.91945	F	16 05	28.069	-.339	-19 07	25.06	+1.22	30.030077
71 03 16.40	1026.90300	I	16 05	21.888	-.390	-19 06	48.09	+2.47	29.932375
71 03 18.39	1028.89750	F	16 05	18.841	-.336	-19 06	34.51	+1.32	29.900643
71 03 21.38	1031.88924	W	16 05	13.233	-.321	-19 06	10.05	+1.21	29.853949
71 03 30.36	1040.86439	F	16 04	49.368	-.366	-19 04	37.22	+2.53	29.721666
71 03 31.36	1041.86163	J	16 04	46.190	-.294	-19 04	26.80	+1.23	29.707789
71 04 03.35	1044.85331	Y	16 04	35.703	-.341	-19 03	49.87	+1.34	29.667260
71 04 04.35	1045.85054	W	16 04	32.034	-.300	-19 03	38.22	+0.19	29.654129
71 04 05.34	1046.84777	I	16 04	28.185	-.326	-19 03	24.20	+1.12	29.641203
71 04 08.33	1049.83944	I	16 04	16.075	-.311	-19 02	42.93	+1.49	29.603609
71 04 09.33	1050.83666	T	16 04	11.758	-.373	-19 02	29.25	+0.97	29.591493
71 04 10.33	1051.83388	Y	16 04	07.436	-.341	-19 02	14.29	+1.49	29.579589
71 04 11.33	1052.83109	S	16 04	02.965	-.359	-19 02	00.47	+0.62	29.567905
71 04 12.32	1053.82831	H	16 03	58.332	-.443	-19 01	45.44	+0.72	29.556439
71 04 13.32	1054.82553	P	16 03	53.779	-.352	-19 01	29.91	+1.07	29.545195
71 04 15.31	1056.81996	W	16 03	44.223	-.349	-19 00	58.50	+1.50	29.523383
71 04 17.31	1058.81438	P	16 03	34.309	-.344	-19 00	26.79	+1.45	29.502511
71 04 19.30	1060.80880	D	16 03	24.014	-.366	-18 59	53.85	+1.84	29.482578
71 04 20.30	1061.80601	I	16 03	18.788	-.324	-18 59	37.77	+1.36	29.472982
71 04 21.30	1062.80322	J	16 03	13.396	-.363	-18 59	20.83	+1.53	29.463633
71 04 23.29	1064.79763	H	16 03	02.454	-.356	-18 58	46.94	+1.26	29.445697
71 04 25.29	1066.79204	S	16 02	51.246	-.319	-18 58	11.32	+1.96	29.428779
71 04 26.28	1067.78924	T	16 02	45.476	-.366	-18 57	54.39	+1.20	29.420718
71 04 30.27	1071.77805	J	16 02	21.965	-.350	-18 56	42.80	+0.81	29.391140
71 05 01.27	1072.77525	P	16 02	15.941	-.338	-18 56	23.95	+1.39	29.384423
71 05 04.26	1075.76685	G	16 01	57.487	-.344	-18 55	28.66	+1.18	29.365919
71 05 09.25	1080.75283	S	16 01	25.790	-.337	-18 53	54.58	+0.72	29.340671
71 05 10.25	1081.75002	H	16 01	19.328	-.345	-18 53	34.25	+1.92	29.336473
71 05 11.24	1082.74722	W	16 01	12.814	-.372	-18 53	16.04	+0.95	29.332556
71 05 15.23	1086.73599	P	16 00	46.610	-.356	-18 51	58.50	+1.57	29.319761
71 05 18.22	1089.72757	I	16 00	26.695	-.348	-18 51	00.82	+1.41	29.313214
71 05 23.21	1094.71353	I	15 59	53.172	-.371	-18 49	24.60	+1.07	29.308145
71 05 24.21	1095.71072	Y	15 59	46.556	-.279	-18 49	05.28	+1.16	29.308017
71 06 02.18	1104.68546	H	15 58	46.486	-.320	-18 46	14.94	+2.08	29.320047
71 06 04.17	1106.67984	J	15 58	33.296	-.355	-18 45	38.57	+1.79	29.325906
71 06 09.16	1111.66582	T	15 58	01.030	-.316	-18 44	09.24	+1.84	29.345515
71 06 11.16	1113.66021	P	15 57	48.349	-.354	-18 43	35.12	+1.44	29.355318
71 06 18.14	1120.64061	H	15 57	05.571	-.328	-18 41	40.54	+0.93	29.398193
71 06 19.13	1121.63781	W	15 56	59.666	-.341	-18 41	24.22	+1.58	29.405390
71 06 20.13	1122.63501	Y	15 56	53.811	-.370	-18 41	09.09	+1.28	29.412844
71 06 21.13	1123.63221	T	15 56	48.081	-.343	-18 40	53.52	+1.67	29.420557
71 06 22.12	1124.62942	J	15 56	42.395	-.341	-18 40	38.11	+2.15	29.428529
71 06 25.12	1127.62103	T	15 56	25.797	-.297	-18 39	54.84	+2.28	29.453973
71 06 26.11	1128.61824	D	15 56	20.369	-.322	-18 39	41.99	+1.28	29.462946
71 06 28.11	1130.61266	I	15 56	09.797	-.316	-18 39	15.39	+0.97	29.481620
71 07 03.09	1135.59872	A	15 55	44.817	-.299	-18 38			29.532391
71 07 05.09	1137.59315	T	15 55	35.410	-.343	-18 37	49.16	+1.81	29.554261
71 07 08.08	1140.58480	A	15 55	22.066	-.368	-18 37			29.588661
71 07 09.08	1141.58202	A	15 55	17.828	-.360	-18 37			29.600544
71 07 13.07	1145.57092	A	15 55	01.877	-.309	-18 36			29.650027
71 07 14.06	1146.56814	H	15 54	58.122	-.316	-18 36	23.09	+1.38	29.662874

NEPTUNE

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244		h m s	s			° ' "	"		
71 07 15.06	1147.56537	N	15 54	54.452	-.347		-18 36			29.675900
71 07 16.06	1148.56260	D	15 54	50.953	-.318		-18 36			29.689114
71 07 17.05	1149.55983	P	15 54	47.507	-.350		-18 35 59.80	+1.83		29.702498
71 07 18.05	1150.55706	I	15 54	44.213	-.344		-18 35 53.07	+1.70		29.716061
71 07 21.04	1153.54876	L	15 54	35.036	-.314		-18 35 35.47	+1.04		29.757741
71 07 22.04	1154.54600	H	15 54	32.141	-.370		-18 35 29.77	+1.44		29.771949
71 07 24.04	1156.54048	S	15 54	26.857	-.322		-18 35 20.31	+1.44		29.800822

CERES

71 01 07.99	0959.49012	G	1 45	02.933	-.064		+ 3 30 45.17	+0.24		2.487611
71 01 14.97	0966.47356	I	1 48	44.322	-.085		+ 4 23 48.72	-0.88		2.578452
71 01 16.96	0968.46895	R	1 49	57.651	-.094		+ 4 39 32.97	+0.15		2.604542
71 01 19.96	0971.46212	S	1 51	55.666	-.090		+ 5 03 32.55	+0.05		2.643706
71 01 23.95	0975.45318	P	1 54	47.490	-.099		+ 5 36 14.24	-0.18		2.695868
71 11 09.47	1264.97361	H	9 25	39.933	-.030		+21 50 36.04	-0.17		2.398969
71 11 12.46	1267.96765	I	9 28	53.572	+.065		+21 50 09.92	0.00		2.358569
71 11 14.46	1269.96362	W	9 30	57.692	+.025		+21 50 24.05	+0.33		2.331684
71 11 17.45	1272.95749	H	9 33	56.292	+.020		+21 51 34.05	-0.44		2.291479
71 11 18.45	1273.95542	S	9 34	53.715	+.012		+21 52 12.15	+0.08		2.278123
71 11 19.45	1274.95334	D	9 35	50.075	+.023		+21 52 57.03	+0.14		2.264793
71 11 22.44	1277.94703	H	9 38	32.440	+.007		+21 55 55.73	-0.57		2.224998
71 12 02.42	1287.92508	F	9 46	16.258	+.039		+22 14 40.25	+0.44		2.095366
71 12 03.42	1288.92280	H	9 46	55.646	+.031		+22 17 19.72	+0.14		2.082733
71 12 05.41	1290.91820	I	9 48	10.358	+.014		+22 23 06.72	+0.14		2.057685
71 12 16.39	1301.89171	S	9 53	17.222	-.008		+23 06 18.42	+0.20		1.926296
71 12 22.37	1307.87633	S	9 54	44.088	+.029		+23 38 09.98	-0.12		1.860451
71 12 23.37	1308.87370	C	9 54	52.640	-.009		+23 44 02.55	+0.28		1.849964
71 12 25.36	1310.86837	R	9 55	04.668	-.021		+23 56 14.41	+0.08		1.829447
71 12 31.35	1316.85193	I	9 54	59.205	+.010		+24 36 19.47	-0.85		1.771812

PALLAS

71 09 10.42	1204.92738	H	4 22	21.882	+.023		-10 09 11.49	-0.48		2.094128
71 09 15.41	1209.91666	F	4 26	36.240	+.036		-11 29 29.24	-0.27		2.035379
71 09 16.41	1210.91448	J	4 27	23.637	+.012		-11 46 06.18	-0.58		2.023945
71 09 25.39	1219.89418	W	4 33	33.834	+.040		-14 22 59.76	-0.17		1.926344
71 10 08.36	1232.86253	H	4 39	07.191	+.039		-18 27 11.24	-0.69		1.804678
71 10 11.35	1235.85480	I	4 39	46.590	+.043		-19 25 07.39	-0.96		1.780217
71 10 12.35	1236.85218	D	4 39	56.371	+.035		-19 44 27.63	-0.59		1.772384
71 10 18.33	1242.83606	W	4 40	19.034	+.022		-21 40 07.38	-0.82		1.728879
71 10 19.33	1243.83330	H	4 40	16.747	+.041		-21 59 12.84	-0.22		1.722224
71 10 29.30	1253.80463	F	4 38	17.988	+.022		-25 03 33.67	-0.86		1.665414
71 11 04.28	1259.78649	F	4 35	46.049	.000		-26 44 51.87	-0.48		1.639960
71 11 05.28	1260.78340	W	4 35	15.226	+.011		-27 00 49.77	-0.99		1.636348
71 11 06.28	1261.78030	D	4 34	42.902	+.034		-27 16 28.28	-0.04		1.632916
71 11 08.27	1263.77404	T	4 33	33.829	+.058		-27 46 50.91	-0.60		1.626592
71 11 11.26	1266.76453	J	4 31	39.682	+.039		-28 29 50.54	-0.58		1.618448
71 11 12.26	1267.76133	I	4 30				-28 43 26.77	-0.73		1.616090
71 11 17.24	1272.74513	H	4 27	18.351	+.032		-29 45 26.72	-0.17		1.606946
71 11 18.24	1273.74186	S	4 26	31.167	+.029		-29 56 34.92	-0.64		1.605641
71 11 19.23	1274.73857	D	4 25	43.159	+.067		-30 07 15.69	-0.45		1.604506
71 11 21.23	1276.73198	I	4 24	04.687	+.012		-30 27 14.88	-0.07		1.602748
71 11 22.22	1277.72867	H	4 23	14.456	+.006		-30 36 33.74	-1.22		1.602121
71 12 02.19	1287.69534	F	4 14	32.782	+.032		-31 42 37.18	-0.57		1.604659
71 12 03.19	1288.69200	H	4 13	40.318	+.009		-31 46 27.64	+0.19		1.605751
71 12 05.18	1290.68534	S	4 11	56.253	+.025		-31 52 38.93	+0.22		1.608365
71 12 12.16	1297.66221	R	4 06	08.109	+.045		-31 58 29.19	-1.48		1.621844

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 17

PALLAS

Date	J.E.D.	O L	Obs. R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
	244		h m s	s		° ' "	"	
71 12 19.13	1304.63958	J	4 01 03.549	+0.056	-31 40	21.84	-0.52	1.641518
71 12 22.13	1307.63010	H	3 59 11.773	+0.053	-31 25	41.88	+0.89	1.651657
71 12 23.12	1308.62697	I	3 58 37.382	+0.032	-31 19	58.89	-0.80	1.655248
71 12 29.10	1314.60859	H	3 55 44.338	+0.030	-30 37	02.15	-0.01	1.678832

JUNO

71 01 08.05	0959.55734	G	3 22 06.430	+0.052	- 1 44	41.10	-0.04	1.333149
71 01 12.04	0963.54789	G	3 24 14.063	+0.054	- 1 06	08.80	+0.55	1.371326
71 01 15.04	0966.54101	I	3 26 07.502	+0.004	- 0 36	01.88	+0.18	1.400863
71 01 17.03	0968.53651	R	3 27 31.357	+0.029	- 0 15	26.90	+0.78	1.420958
71 01 19.03	0970.53209	P	3 29 01.558	+0.033	+ 0 05	28.67	+1.48	1.441358
71 01 20.02	0971.52991	S	3 29 49.011	+0.043	+ 0 16	02.57	+1.07	1.451669
71 01 21.02	0972.52775	D	3 30 38.009	+0.059	+ 0 26	40.33	+0.34	1.462051
71 01 24.02	0975.52136	P	3 33 14.007	+0.051	+ 0 58	57.93	+0.42	1.493606

VESTA

71 05 19.40	1090.90958	F	20 27 12.028	+0.058	-18 19	29.11	+0.19	1.562848
71 05 23.40	1094.90038	I	20 29 41.857	+0.069	-18 23	18.83	-0.22	1.522843
71 05 27.39	1098.89088	F	20 31 44.575	+0.093	-18 29	21.75	-0.05	1.484119
71 06 01.37	1103.87854	I	20 33 38.031	+0.057	-18 40	16.52	+0.17	1.437825
71 06 04.37	1106.87088	P	20 34 24.176	+0.054	-18 48	40.93	+0.28	1.411319
71 06 05.36	1107.86828	W	20 34 35.870	+0.097	-18 51	48.24	+0.13	1.402714
71 06 07.36	1109.86302	T	20 34 53.506	+0.093	-18 58	31.53	-0.13	1.385866
71 06 09.35	1111.85768	T	20 35 03.490	+0.062	-19 05	52.86	+0.14	1.369523
71 06 13.34	1115.84672	W	20 35 00.304	+0.067	-19 22	32.65	-0.30	1.338450
71 06 18.33	1120.83251	H	20 34 12.136	+0.080	-19 46	57.24	-0.71	1.302925
71 06 19.32	1121.82960	W	20 33 56.591	+0.073	-19 52	17.48	-0.31	1.296299
71 06 20.32	1122.82667	Y	20 33 39.089	+0.059	-19 57	46.03	+0.71	1.289844
71 06 21.32	1123.82372	T	20 33 19.702	+0.101	-20 03	25.16	-0.06	1.283562
71 06 22.32	1124.82074	J	20 32 58.328	+0.079	-20 09	12.31	-0.29	1.277457
71 06 25.31	1127.81168	T	20 31 42.931	+0.101	-20 27	21.90	-0.06	1.260244
71 06 26.30	1128.80861	D	20 31 14.058	+0.075	-20 33	40.56	-0.05	1.254886
71 06 28.30	1130.80242	I	20 30 10.992	+0.078	-20 46	39.08	-0.01	1.244759
71 07 03.28	1135.78661	W	20 27 03.703	+0.077	-21 20	52.40	-0.08	1.223025
71 07 04.28	1136.78339	S	20 26 21.512	+0.069	-21 27	58.08	+0.12	1.219316
71 07 06.27	1138.77691	Y	20 24 52.811	+0.065	-21 42	21.97	-0.15	1.212554
71 07 07.27	1139.77364	S	20 24 06.405	+0.068	-21 49	38.28	+0.47	1.209507
71 07 09.26	1141.76707	I	20 22 29.736	+0.060	-22 04	20.12	+0.50	1.204091
71 07 12.25	1144.75710	W	20 19 56.081	+0.110	-22 26	36.43	+0.13	1.197695
71 07 15.24	1147.74703	L	20 17 13.488	+0.085	-22 48	57.16	-0.32	1.193422
71 07 16.24	1148.74366	D	20 16 17.753	+0.155	-22 56	22.04	+0.22	1.192479
71 07 18.23	1150.73689	I	20 14 24.160	+0.110	-23 11	08.22	+0.01	1.191324
71 07 21.22	1153.72669	L	20 11 30.257	+0.064	-23 32	57.55	+0.08	1.191440
71 07 22.22	1154.72328	H	20 10 31.722	+0.064	-23 40	07.53	-0.57	1.191974
71 07 23.21	1155.71987	W	20 09 33.019	+0.037	-23 47	11.99	-0.04	1.192757
71 07 24.21	1156.71647	S	20 08 34.336	+0.073	-23 54	12.00	+0.13	1.193789
71 07 28.20	1160.70285	G	20 04 40.973	+0.119	-24 21	15.88	+0.31	1.200393
71 07 29.19	1161.69946	F	20 03 43.412	+0.080	-24 27	46.40	-0.28	1.202660
71 08 06.17	1169.67259	L	19 56 28.779	+0.073	-25 15	07.82	-0.20	1.229420
71 08 07.16	1170.66929	Y	19 55 38.815	+0.081	-25 20	24.53	+0.29	1.233814
71 08 08.16	1171.66599	S	19 54 50.049	+0.086	-25 25	33.42	-0.40	1.238435
71 08 09.16	1172.66272	T	19 54 02.527	+0.071	-25 30	32.46	-0.34	1.243279
71 08 10.15	1173.65945	J	19 53 16.308	+0.038	-25 35	21.54	+0.51	1.248346
71 08 15.14	1178.64339	Y	19 49 47.400	+0.055	-25 57	11.16	+0.06	1.276924
71 08 20.12	1183.62780	F	19 46 59.960	+0.097	-26 15	04.39	-0.60	1.310671
71 08 24.11	1187.61572	L	19 45 19.281	+0.074	-26 26	32.65	-0.28	1.341127

VESTA

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L Obs.	Decl.	(O-C)	Distance
244									
			h m s	s		° ' "	"		
71 08 25.11	1188.61276	J	19 44 59.001	+0.076	-26 29 01.64	-0.24	1.349192		
71 08 26.10	1189.60981	Y	19 44 40.675	+0.038	-26 31 21.07	+0.26	1.357430		
71 08 29.10	1192.60113	W	19 43 57.967	+0.093	-26 37 27.97	-0.43	1.383142		
71 08 30.09	1193.59828	T	19 43 47.735	+0.055	-26 39 12.50	-0.34	1.392033		
71 08 31.09	1194.59546	I	19 43 39.607	+0.087	-26 40 48.13	+0.12	1.401080		
71 09 05.08	1199.58168	Y	19 43 29.124	+0.067	-26 46 44.33	+0.52	1.448495		
71 09 06.07	1200.57900	S	19 43 33.034	+0.062	-26 47 32.27	-0.08	1.458392		
71 09 07.07	1201.57634	T	19 43 38.941	+0.078	-26 48 11.64	+0.16	1.468420		
71 09 08.07	1202.57370	J	19 43 46.759	+0.037	-26 48 43.80	-0.05	1.478577		
71 09 09.07	1203.57108	D	19 43 56.612	+0.071	-26 49 08.37	-0.22	1.488858		
71 09 10.06	1204.56848	H	19 44 08.386	+0.078	-26 49 24.79	+0.32	1.499261		
71 09 15.05	1209.55584	F	19 45 35.943	+0.097	-26 49 01.23	-0.03	1.553013		
71 09 16.05	1210.55338	J	19 45 59.070	+0.086	-26 48 34.92	+0.32	1.564089		
71 09 18.04	1212.54852	H	19 46 50.822	+0.075	-26 47 21.85	+0.80	1.586544		
71 09 25.03	1219.53213	R	19 50 47.533	+0.091	-26 39 38.08	-0.05	1.667965		
71 09 29.02	1223.52320	I	19 53 39.267	+0.069	-26 32 51.37	+0.32	1.716179		
71 09 30.02	1224.52101	R	19 54 26.086	+0.076	-26 30 54.61	+0.13	1.728396		
71 10 07.00	1231.50614	F	20 00 33.913	+0.093	-26 14 27.79	+1.09	1.815472		
71 10 08.00	1232.50408	H	20 01 31.913	+0.125	-26 11 44.50	+0.04	1.828109		
71 10 11.99	1236.49598	R	20 05 36.339	+0.096	-25 59 49.28	+0.33	1.879080		
71 10 12.99	1237.49399	I	20 06 40.498	+0.110	-25 56 36.52	+0.03	1.891919		
71 10 14.99	1239.49005	W	20 08 52.197	+0.040	-25 49 52.14	+1.09	1.917693		
71 10 15.98	1240.48810	P	20 09 59.848	+0.110	-25 46 22.42	+0.57	1.930627		
71 10 21.97	1246.47665	D	20 17 07.748	+0.108	-25 23 21.21	+0.98	2.008716		
71 10 28.96	1253.46381	F	20 26 10.717	+0.053	-24 52 17.01	+0.15	2.100441		
71 11 03.95	1259.45317	F	20 34 28.053	+0.057	-24 22 06.66	-0.19	2.179136		
71 11 04.95	1260.45142	C	20 35 53.460	+0.037	-24 16 45.15	+0.78	2.192235		
71 11 05.94	1261.44968	D	20 37 19.614	+0.087	-24 11 19.63	+0.46	2.205326		
71 11 07.94	1263.44623	I	20 40 13.785	+0.090	-24 00 12.21	+0.38	2.231480		
71 11 08.94	1264.44452	H	20 41 41.881	+0.154	-23 54 30.71	+0.22	2.244540		
71 11 10.94	1266.44111	C	20 44 39.739	+0.120	-23 42 51.11	+0.68	2.270618		
71 11 11.93	1267.43942	W	20 46 09.563	+0.115	-23 36 53.90	+0.41	2.283633		
71 11 13.93	1269.43605	R	20 49 10.887	+0.080	-23 24 43.16	+0.46	2.309607		
71 11 14.93	1270.43438	T	20 50 42.369	+0.058	-23 18 30.26	+0.16	2.322561		
71 11 15.93	1271.43271	S	20 52 14.413	+0.067	-23 12 11.53	+0.48	2.335493		
71 11 17.92	1273.42939	R	20 55 20.048	+0.093	-22 59 18.86	+0.82	2.361281		
71 11 21.92	1277.42282	R	21 01 37.022	+0.097	-22 32 33.48	+0.36	2.412507		

FLORA

71 08 20.41	1183.91069	F	2 35 28.453	+0.028	+ 6 31 17.79	+1.45	1.310226
71 08 24.40	1187.90288	L	2 39 57.710	+0.104	+ 6 34 37.62	+1.54	1.271221
71 08 25.40	1188.90088	J	2 41 01.501	+0.105	+ 6 35 04.34	+1.91	1.261612
71 08 29.39	1192.89274	W	2 45 01.754	+0.069	+ 6 35 15.65	+1.82	1.223803
71 08 30.39	1193.89065	T	2 45 57.989	+0.090	+ 6 34 55.72	+2.44	1.214515
71 09 04.37	1198.87996	W	2 50 14.356	+0.055	+ 6 30 53.35	+2.39	1.169160
71 09 05.37	1199.87776	Y	2 51 00.503	+0.072	+ 6 29 37.33	+2.63	1.160317
71 09 06.37	1200.87554	S	2 51 44.873	+0.102	+ 6 28 11.53	+2.32	1.151554
71 09 09.36	1203.86876	D	2 53 46.821	+0.094	+ 6 23 00.51	+2.84	1.125764
71 09 10.36	1204.86646	H	2 54 23.669	+0.095	+ 6 20 58.10	+2.42	1.117342
71 09 15.35	1209.85458	F	2 56 57.751	+0.095	+ 6 08 35.30	+2.46	1.076649
71 09 16.35	1210.85214	J	2 57 22.305	+0.088	+ 6 05 40.86	+2.40	1.068814
71 09 25.32	1219.82897	W	2 59 24.188	+0.081	+ 5 33 44.71	+3.23	1.003556
71 10 07.29	1231.79478	F	2 57 21.081	+0.089	+ 4 39 04.26	+3.98	0.934057
71 10 08.29	1232.79177	H	2 56 56.236	+0.032	+ 4 34 08.52	+3.41	0.929308

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 19

FLORA

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244		h m s	s			° ' "	"		
71 10 15.26	1239.76998	J	2 53	04.464	+0.069	+ 3	59 29.69	+4.24		0.901144
71 10 19.25	1243.75705	H	2 50	10.668	+0.050	+ 3	40 18.95	+4.47		0.889318
71 10 29.22	1253.72366	F	2 41	23.087	+0.038	+ 2	59 13.09	+5.17		0.874548
71 11 04.20	1259.70325	F	2 35	34.622	.000	+ 2	42 11.81	+5.31		0.876230
71 11 05.19	1260.69985	W	2 34	36.353	+0.020	+ 2	40 03.30	+4.35		0.877287
71 11 09.18	1264.68627	H	2 30	46.352	+0.014	+ 2	33 49.24	+5.25		0.883723
71 11 11.17	1266.67952	C	2 28	54.729	+0.029	+ 2	32 07.77	+5.59		0.888262
71 11 14.16	1269.66947	W	2 26	13.790	+0.018	+ 2	31 28.25	+5.88		0.896699
71 11 16.16	1271.66284	S	2 24	32.024	+0.026	+ 2	32 19.10	+5.70		0.903393
71 11 17.15	1272.65954	H	2 23	43.017	-0.026	+ 2	33 08.23	+5.65		0.907055
71 11 29.12	1284.62149	T	2 16	05.046	+0.033	+ 3	03 26.53	+5.24		0.966394
71 12 01.11	1286.61546	R	2 15	15.695	+0.012	+ 3	12 02.12	+6.15		0.978831
71 12 02.11	1287.61248	F	2 14	54.216	+0.040	+ 3	16 39.91	+5.45		0.985299
71 12 03.10	1288.60953	H	2 14	34.799	+0.006	+ 3	21 32.04	+5.33		0.991929
71 12 05.10	1290.60369	S	2 14	02.431	-0.001	+ 3	31 56.67	+5.30		1.005664
71 12 12.08	1297.58406	R	2 13	17.402	+0.009	+ 4	14 57.25	+5.21		1.058430
71 12 19.06	1304.56566	J	2 14	18.811	+0.023	+ 5	07 01.08	+4.95		1.117740
71 12 22.05	1307.55814	H	2 15	16.973	.000	+ 5	31 42.16	+5.15		1.144903
71 12 23.05	1308.55568	I	2 15	40.509	+0.022	+ 5	40 11.80	+4.50		1.154168
71 12 28.04	1313.54373	F	2 18	07.928	-0.007	+ 6	24 35.19	+5.48		1.201929
71 12 29.04	1314.54140	H	2 18	43.243	+0.030	+ 6	33 46.86	+4.56		1.211749
71 12 31.03	1316.53682	K	2 19	59.321	-0.014	+ 6	52 30.25	+4.91		1.231641

METIS

71 08 08.40	1171.90554	S	1 40	43.691	-0.008	+ 2	59 25.31	-0.12		1.709919
71 08 09.40	1172.90326	T	1 41	22.600	+0.001	+ 3	01 08.85	-0.06		1.697879
71 08 24.36	1187.86705	L	1 48	13.426	-0.018	+ 3	10 28.23	+0.24		1.526609
71 08 25.36	1188.86449	J	1 48	28.230	-0.006	+ 3	09 58.10	+0.20		1.515954
71 08 26.36	1189.86191	Y	1 48	41.357	+0.016	+ 3	09 19.69	+0.23		1.505413
71 08 29.35	1192.85405	W	1 49	10.326	-0.047	+ 3	06 35.58	+1.14		1.474507
71 09 04.33	1198.83779	W	1 49	20.820	-0.081	+ 2	57 27.22	+1.56		1.416206
71 09 05.33	1199.83501	Y	1 49	16.291	-0.056	+ 2	55 26.91	+0.34		1.406982
71 09 06.33	1200.83220	S	1 49	09.925	-0.038	+ 2	53 19.93	+0.18		1.397906
71 09 07.32	1201.82938	T	1 49	01.722	-0.022	+ 2	51 05.68	+0.36		1.388984
71 09 08.32	1202.82653	J	1 48	51.670	-0.015	+ 2	48 43.89	+0.51		1.380216
71 09 09.32	1203.82367	D	1 48	39.751	-0.028	+ 2	46 15.13	+1.04		1.371609
71 09 16.30	1210.80299	J	1 46	24.532	-0.043	+ 2	25 35.74	+0.12		1.316154
71 09 25.27	1219.77493	W	1 41	22.597	-0.032	+ 1	52 22.80	+0.93		1.258778
71 09 29.26	1223.76199	D	1 38	27.397	-0.058	+ 1	36 07.35	+0.68		1.238913
71 09 30.25	1224.75871	I	1 37	40.212	-0.042	+ 1	31 59.97	+1.23		1.234521
71 10 07.23	1231.73542	F	1 31	38.209	-0.072	+ 1	03 03.40	+0.73		1.210456
71 10 08.23	1232.73205	H	1 30	42.765	-0.079	+ 0	59 00.51	+0.76		1.207994
71 10 13.21	1237.71509	C	1 25	56.267	-0.073	+ 0	39 34.17	+0.85		1.199447
71 10 15.20	1239.70828	J	1 23	58.825	-0.082	+ 0	32 19.06	+0.97		1.197807
71 10 19.19	1243.69463	H	1 20	02.976	-0.077	+ 0	19 03.57	+1.24		1.197596
71 10 29.16	1253.66084	F	1 10	40.831	-0.127	- 0	04 12.04	+1.50		1.214673
71 11 04.14	1259.64108	F	1 05	48.139	-0.083	- 0	09 42.63	+1.39		1.236348
71 11 08.12	1263.62822	I	1 03	00.125	-0.084	- 0	09 25.44	+2.25		1.255190
71 11 09.12	1264.62505	H	1 02	21.962	-0.088	- 0	08 51.77	+1.33		1.260423
71 11 11.11	1266.61876	C	1 01	10.561	-0.093	- 0	07 05.17	+1.61		1.271493
71 11 14.10	1269.60948	R	0 59	36.337	-0.100	- 0	02 52.30	+1.62		1.289554
71 11 16.10	1271.60340	S	0 58	42.547	-0.059	+ 0	00 58.79	+1.68		1.302523
71 11 17.10	1272.60039	R	0 58	18.375	-0.092	+ 0	03 13.03	+1.74		1.309275
71 11 28.06	1283.56876	F	0 55	59.594	-0.055	+ 0	41 06.58	+2.29		1.394009

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

METIS

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244		h m s	s			° ' "	"		
71 11 29.06	1284.56601	T	0 55	58.533	-.122	+	0 45	40.99	+1.07	1.402554
71 12 01.06	1286.56060	R	0 56	02.335	-.078	+	0 55	25.22	+1.78	1.420009
71 12 02.05	1287.55792	F	0 56	07.099	-.048	+	1 00	32.97	+1.97	1.428913
71 12 03.05	1288.55527	H	0 56	13.704	-.060	+	1 05	50.38	+1.53	1.437930
71 12 05.05	1290.55002	S	0 56	32.503	-.075	+	1 16	56.03	+1.37	1.456287
71 12 14.02	1299.52746	C	0 59	26.474	-.067	+	2 14	37.10	+1.35	1.543636
71 12 19.01	1304.51562	J	1 02	03.424	-.065	+	2 51	40.35	+2.28	1.594931
71 12 22.00	1307.50873	H	1 03	57.023	-.061	+	3 15	24.05	+1.31	1.626443
71 12 27.99	1313.49545	F	1 08	25.123	-.109	+	4 05			1.690746

The following observations of Mercury and Ceres were accidentally omitted from *Circular* No. 136:

SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

MERCURY

Date	J.E.D.	O L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)	Distance
	244		h m s	s			° ' "	"		
70 09 28.66	0858.16328	D C	11 14	54.533	+.092	C +	6 03	59.59	-0.99	0.957159

CERES

70 08 22.40	0820.90429	I	2 35	03.412	-.153	+	3 04	29.82	+0.70	2.383496
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SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS 21

MOON

Lun.	Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)
		244			h m s	s			° ' "	"	
594	71 01 06.01	0957.51746	F	1	2 16	40.509	1.766		+18 57		
	71 01 08.09	0959.59265	G	1	4 13	07.538	1.654		+26 19		
	71 01 10.17	0961.67112	W	1	6 14	18.658	1.652		+27 25		
	71 01 12.24	0963.74396	F	2	8 07	22.364	1.472	N	+22 26	49.95	-5.83
	71 01 16.36	0967.86275	S	2	11 14	39.726	1.156	S	+ 2 28	37.21	-9.53
	71 01 18.41	0969.91725	H	2	12 41	14.492	1.247	S	- 8 45	15.13	-8.69
	71 01 19.44	0970.94599	F	2	13 26	41.099	1.319	S	-14 03	56.43	-9.19
	71 01 20.47	0971.97682	G	2	14 15	09.174	1.509	S	-18 54	43.89	-7.73
596	71 03 06.03	1016.53563	W	1	6 35	30.969	1.592		+26 58		
	71 03 07.07	1017.57182	I	1	7 31	42.772	1.497	N	+24 39	49.51	-6.54
	71 03 08.10	1018.60554	H	1	8 24	20.914	1.397	N	+21 11	25.74	-6.58
	71 03 09.13	1019.63688	H	1	9 13	32.811	1.323	N	+16 49	26.13	-8.33
	71 03 10.16	1020.66625	I	1	9 59	53.646	1.182	N	+11 49	09.31	-10.11
	71 03 12.22	1022.72145	T	2	11 27	28.545	1.009	S	+ 0 46	24.79	-10.21
	71 03 14.27	1024.77634	W	2	12 54	37.725	1.250	S	-10 22	31.47	-8.84
	71 03 16.33	1026.83627	I	2	14 29	02.591	1.465	S	-20 04	49.08	-5.99
	71 03 17.36	1027.86955	S		15 21			S	-23 49	14.23	-6.49
	71 03 18.40	1028.90543	F		16 16			S	-26 27	17.51	-3.88
597	71 04 04.01	1045.51990	G	1	8 07	08.035	1.445	N	+22 19	05.11	-5.67
	71 04 05.05	1046.55214	R	1	8 57	37.735	1.389	N	+18 13	00.62	-7.57
	71 04 08.13	1049.63778	D	1	11 13	06.407	1.158	N	+ 2 36	55.30	-8.34
	71 04 09.16	1050.66490	F	1	11 56	13.219	1.191	N	- 3 01	03.05	-8.36
	71 04 10.19	1051.69249	I	1	12 40	00.144	1.313		- 8 33		
	71 04 11.22	1052.72122	S	2	13 25	25.408	1.291	S	-13 50	14.66	-8.72
	71 04 12.25	1053.75170	H	2	14 13	22.751	1.411	S	-18 36	31.92	-8.14
	71 04 13.28	1054.78441	P	2	15 04	33.602	1.469	S	-22 37	35.49	-5.64
	71 04 15.35	1056.85694	W	2	16 57	10.752	1.719	S	-27 17	13.64	-0.90
	71 04 16.39	1057.89581	T	2	17 57	14.535	1.757		-27 25		
	71 04 17.43	1058.93510	P	2	18 57	54.668	1.674		-25 55		
598	71 05 01.96	1073.46536	Y	1	8 38	46.389	1.420	N	+19 37	29.21	-8.38
	71 05 05.05	1076.55327	I	1	10 57	32.010	1.175	N	+ 4 25	54.32	-9.00
	71 05 09.16	1080.66618	S	1	13 56	20.747	1.278	N	-17 01	29.84	-7.60
	71 05 10.19	1081.69841	H	1	14 46	49.964	1.484	S	-21 19	07.85	-5.99
	71 05 11.23	1082.73318	W	2	15 40	58.851	1.607	S	-24 40	04.49	-5.02
	71 05 12.27	1083.77036	J		16 38			S	-26 46	15.84	-1.57
	71 05 15.38	1086.88751	P	2	19 39	35.629	1.651		-23 40		
599	71 06 06.11	1108.61072	R		14 26			N	-19 49	56.10	-6.72
	71 06 07.14	1109.64471	Y	1	15 19	40.702	1.541		-23 33		
	71 06 09.22	1111.72036	T	2	17 16	48.326	1.718	S	-27 16	42.96	+4.73
	71 06 10.26	1112.76045	F	2	18 18	38.278	1.727	S	-26 46	13.05	+2.78
	71 06 11.30	1113.80029	P	2	19 20	06.803	1.830	N	-24 33	50.59	+4.97
	71 06 13.37	1115.87530	W	2	21 16	17.542	1.616	N	-15 46	50.31	+9.27
600	71 07 04.05	1136.55492	S	1	14 56	28.823	1.498	N	-22 12	41.93	-5.09
	71 07 05.09	1137.59036	T	1	15 51	36.114	1.579	N	-25 16	38.53	-3.79
	71 07 06.12	1138.62851	Y	1	16 50	37.867	1.770	S	-27 02	18.74	-1.40
	71 07 07.16	1139.66860	S	1	17 52	27.523	1.747	S	-27 12	41.73	-0.14
	71 07 08.20	1140.70930	P		18 55			S	-25 38	26.38	+3.89
	71 07 09.24	1141.74922	I	2	19 56	45.619	1.677	S	-22 22	18.28	+6.21
	71 07 12.35	1144.85834	W	2	22 46	08.514	1.588	N	- 5 18	37.50	+12.28
	71 07 13.39	1145.89217	F	2	23 38	56.396	1.538	N	+ 1 28	39.66	+10.86
601	71 08 06.19	1169.69513	L	1	20 29	03.150	1.655	S	-19 58	33.75	+8.28
	71 08 07.23	1170.73302	Y	2	21 27	41.544	1.677	N	-14 28	32.67	+10.23
	71 08 08.26	1171.76929	S	2	22 24	00.583	1.560		- 8 02		
	71 08 11.37	1174.87469	C	2	1 08	02.380	1.652	N	+12 26	55.47	+9.06
602	71 08 31.02	1194.52129	I	1	17 56	35.936	1.589	S	-27 10	03.25	+1.47
	71 09 01.06	1195.56094	C	1	18 57	47.874	1.711	S	-25 31	46.16	+4.87
	71 09 03.13	1197.63883	L	1	20 58	08.911	1.671	S	-17 24	28.52	+8.90
	71 09 04.17	1198.67604	W	1	21 55	49.166	1.606	S	-11 22	40.78	+10.68
	71 09 05.21	1199.71228	Y	1	22 52	05.281	1.603	N	- 4 32	30.49	+11.46

22 SIX-INCH TRANSIT CIRCLE OBSERVATIONS OF THE SUN, MOON, AND PLANETS

MOON											
Lun.	Date	J.E.D.	O	L	Obs.	R.A.	(O-C)	L	Obs.	Decl.	(O-C)
		244			h m s		s		° ' "		"
602	71 09 06.24	1200.74816	S	2	23 47	50.455	1.601		+ 2 37		
	71 09 07.28	1201.78445	T	2	0 44	10.818	1.662	N	+ 9 38	11.25	+10.88
	71 09 08.32	1202.82185	J	2	1 42	07.674	1.667	N	+15 58	59.37	+8.41
	71 09 09.36	1203.86080	D	2	2 42	18.651	1.755	N	+21 12	51.04	+6.77
	71 09 10.40	1204.90122	H	2	3 44	36.937	1.804		+24 57		
603	71 09 29.00	1223.50754	I	1	19 31	04.889	1.666	S	-23 46	38.77	+4.91
	71 09 30.04	1224.54523	R	1	20 29	26.432	1.647	S	-19 47	15.90	+8.02
	71 10 07.30	1231.80828	F	2	3 16	52.252	1.837		+23 20		
	71 10 08.35	1232.85083	H	2	4 22	15.502	1.912	N	+26 10	51.02	+1.73
	71 10 11.47	1235.97227	I	2	7 29	26.037	1.541		+23 46		
604	71 10 29.02	1253.52642	F	1	21 56	36.852	1.524	S	-10 58	11.60	+10.19
	71 11 01.13	1256.63198	J	1	0 40	51.949	1.630	S	+ 9 14	21.74	+11.38
	71 11 03.21	1258.71087	J	2	2 42	39.750	1.835	N	+21 00	18.47	+7.23
	71 11 04.25	1259.75381	F	2	3 48	36.930	1.907	N	+24 48	40.51	+4.48
	71 11 05.29	1260.79781	W	2	4 56	05.717	1.938	N	+26 42	03.09	+0.99
	71 11 06.34	1261.84103	D	2	6 02	26.678	1.902	N	+26 35	42.66	-2.38
	71 11 08.41	1263.91913	T	2	8 03	05.166	1.578	S	+21 24	13.63	-6.68
	71 11 09.45	1264.95308	H	2	8 56	03.013	1.446	S	+17 06	21.63	-8.55
605	71 11 25.97	1281.47296	R	1	22 29	48.451	1.451	S	- 6 46	42.52	+10.16
	71 11 28.04	1283.54037	F	1	0 15	01.776	1.500	S	+ 6 20	43.45	+10.43
	71 11 29.07	1284.57620	T	1	1 10	42.871	1.606	S	+12 45	49.23	+10.01
	71 12 01.15	1286.65573	R	1	3 13	26.071	1.883	N	+23 01	45.93	+5.73
	71 12 02.19	1287.69920	F	1	4 20	09.269	1.913	N	+25 53	12.33	+2.57
	71 12 05.32	1290.82648	I	2	7 35	45.403	1.623	S	+22 55	41.19	-5.95
	71 12 06.36	1291.86299	T	2	8 32	24.700	1.463	S	+18 54	59.90	-7.62
606	71 12 28.06	1313.56275	F	1	2 45	37.920	1.773	S	+21 22	42.26	+6.75
	71 12 29.10	1314.60396	H	1	3 49	04.913	1.816		+24 52		
	71 12 31.19	1316.69016	K	1	6 01	25.583	1.756	N	+26 26	45.39	-1.89